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PRESENTED BY
THE SOCIETY

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J. W. Barkness

FARIBAULT, MINN.,

SECOND CORRESPONDING SECRETARY OF THE MINNESOTA STATE HORTICULTURAL SOCIETY.

FOR BIOGRAPHY SEE PAGE 389 OF THIS VOLUME.

John S. Harris

LA CRESCENT, MINN.,

FOURTH PRESIDENT OF THE MINNESOTA STATE HORTICULTURAL SOCIETY

FOR BIOGRAPHY SEE PAGE 394 OF THIS VOLUME.

ANNUAL REPORT

OF THE

Minnesota State Horticultural Society.

1892.

EMBRACING THE

TRANSACTIONS OF THE SOCIETY DURING THE YEAR ENDING JAN. 22, 1892, PAPERS, DISCUSSIONS, REPORTS, ETC.

EDITED BY THE SECRETARY,

A. W. LATHAM, EXCELSIOR, MINN.

VOL. XX.

SHORTHAND REPORTER,

J. H. SAVAGE, MINNEAPOLIS.

MINNEAPOLIS:
HARRISON & SMITH, PRINTERS.
1892.

LETTER OF TRANSMITTAL TO THE GOVERNOR.

OFFICE OF THE SECRETARY
OF THE MINNESOTA STATE HORTICULTURAL SOCIETY

EXCELSIOR, MINN., March 31, 1892.

To Hon. Wm. R. Merriam, Governor of Minnesota:

SIR:—In compliance with the requirements of the law, I have the honor to submit herewith the annual report of our society for the year ending Jan. 22., 1892.

Respectfully Yours,

A. W. LATHAM,
Secretary.

COMMUNICATION FROM THE SECRETARY.

EXCELSIOR, MINN., March 15th, 1892,

Fellow-members of the Minnesota State Horticultural Society:

It has seemed best to pursue this year the same plan adopted in the publication of the last report in regard to the arrangement of the essays, discussions, reports, etc., under appropriate heads. This plan proves a convenient arrangement for the student of the volume and meets with quite general approval.

Under the present plan of dividing the committee work of the society, it is not possible to provide a perfect classification so that all the material relating to any one subject may be found under the same head; and it may be thought best to make changes in our by-laws to assist in bringing about this desirable result.

Our society enters upon its second quarter-century under most favorable auspices, the membership being nearly double what it was at this date last year. The members of the working committees, with scarcely an exception, have assumed willingly the service asked of them, and every interest connected with the society gives promise of unusual advancement the coming year.

A step of permanent advantage taken by the society is the establishing of an office and library at No. 427 Nicollet Avenue, Minneapolis, wherein a large amount of horticultural material is steadily accumulating.

Let us strive together to make this year the most successful in the history of the society.

Yours fraternally,

A. W. LATHAM,
Secretary.

271501

OFFICERS FOR 1892.

PRESIDENT.

J. M. UNDERWOOD.....Lake City

VICE-PRESIDENTS.

CLARENCE WEDGE, First Congressional District.....Albert Lea
DEWAIN COOK, Second " " .....Windom
L. E. DAY, Third " " .....Farmington
R. S. MACKINTOSH, Fourth " " .....Langdon
J. H. STEVENS, Fifth " " .....Minneapolis
MRS. JENNIE STAGER, Sixth " " .....Sauk Rapids
J. O. BARRETT, Seventh " " .....Browns Valley

SECRETARY.

A. W. LATHAM.....Excelsior

TREASURER.

DITUS DAY.....Farmington

EXECUTIVE COMMITTEE.

(Secretary and Treasurer Ex-officio.)

WYMAN ELLIOT, (Chairman).....Minneapolis
J. S. HARRIS.....La Crescent
S. B. GREEN.....St. Anthony Park
O. F. BRAND.....Faribault
L. H. WILCOX.....Hastings

ENTOMOLOGIST.

PROF. OTTO LUGGER.....St. Anthony Park

LIBRARIAN.

A. W. LATHAM.....Excelsior
(The Library is at Room 2, No. 427 Nicollet Avenue, Minneapolis.)
E. A. CUZNER, (Assistant) Essex and 27th Ave., S. E.....Minneapolis

SUPERINTENDENT OF EXPERIMENT STATIONS, 1892.

PROF. S. B. GREEN (Central Station, University Farm).St. Anthony Park
E. H. S. DARTT .....Owatonna
F. H. FIEDLER.....Fergus Falls
B. F. JENNESS.....Willmar
DEWAIN COOK. .....Windom
CLARENCE WEDGE.....Albert Lea
CHAS. W. SAMPSON (grapes).....Excelsior
O. M. LORD (plums and small fruits).....Minnesota City
C. W. H. HEIDEMAN (plums and small fruits).....New Ulm
D. E. MYERS.....St. Cloud
H. M. LYMAN (apples) .....Excelsior
J. S. HARRIS.....La Crescent
L. R. MOYER.....Montevideo

COMMITTEES FOR 1892.

GENERAL FRUITS.

FIRST CONGRESSIONAL DISTRICT.

M. W. COOK.....Rochester
SIDNEY CORP.....Hammond

SECOND CONGRESSIONAL DISTRICT.

ALFRED TERRY .....Slayton
S. D. RICHARDSON.....Winnebago City

THIRD CONGRESSIONAL DISTRICT.

S. H. KENNEY .....Morristown
G. W. FULLER.....Litchfield

FOURTH CONGRESSIONAL DISTRICT.

J. F. ZATTERSTROM.....Spencer Brook
WM. MACKINTOSH.....Langdon

FIFTH CONGRESSIONAL DISTRICT.

M. PEARCE.....Chowen
B. C. YANCEY.....Edina Mills

SIXTH CONGRESSIONAL DISTRICT.

MRS. P. A. THAYER.....Sauk Rapids
D. E. MYERS.....St. Cloud

SEVENTH CONGRESSIONAL DISTRICT.

REV. O. A. TH. SOLEM.....Halstad
D. T. WHEATON.....Morris

SEEDLING FRUITS.

J. S. HARRIS.....La Crescent

APPLES.

(Including crabs. hybrids, Russians, etc.)

CLARENCE WEDGE.....Albert Lea
R. H. KEEL.....Rochester
H. M. LYMAN.....Excelsior

PLUMS AND CHERRIES.

C. W. H. HEIDEMAN.....New Ulm
O. M. LORD.....Minnesota City
F. E. FORD.....Glencoe

GRAPES.

DANIEL BUCK.....Mankato
A. H. BRACKETT.....Minneapolis
E. J. CUTTS.....Howard

SMALL FRUIT.

(Strawberries, raspberries, blackberries, cranberries, etc.)

M. PEARCE.....Chowen
L. H. WILCOX.....Hastings
J. A. SAMPSON.....Excelsior
MRS. A. A. KENNEDY.....Hutchinson
M. CUTLER.....Sumter

FRUIT BLOSSOMS.

S. B. GREEN.....St. Anthony Park
L. H. WILCOX.....Hastings
C. W. H. HEIDEMAN.....New Ulm

FORESTRY.

G. W. FULLER.....Litchfield
H. J. LUDLOW.....Worthington
MRS. J. H. BROWN.....Lac-qui-parle

DECIDUOUS TREES AND SHRUBS.

L. R. MOYER.....Montevideo
RALPH D. CLEVELAND.....221 Second Ave. S., Minneapolis
WM. WACHLIN.....Faribault

EVERGREENS.

C. P. NICHOLS..... Northfield
G. W. SOMERVILLE..... Sleepy Eye
CLARENCE WEDGE..... Albert Lea

OUT-DOOR HERBACEOUS PLANTS.

(Native or exotic.)

L. R. MOYER..... Montevideo
W. J. WICKERSHEIM..... Idlewild
MISS SARA M. MANNING..... Lake City

HOUSE AND GREENHOUSE PLANTS.

F. G. GOULD..... Excelsior
GUST. MALMQUIST..... Minneapolis
R. S. MACKINTOSH..... Langdon

VEGETABLES.

MRS. A. BONNIWELL..... Hutchinson
JOSHUA ALLYN..... Red Wing
E. M. CHANDLER..... Minneapolis

SUGAR AND SYRUP.

J. F. PORTER..... Red Wing
E. A. LANE..... Chowen
WM. DANFORTH..... Red Wing

NOMENCLATURE AND CATALOGUE.

J. S. HARRIS..... La Crescent
E. H. S. DARTT..... Owatonna
S. B. GREEN..... St. Anthony Park

HORTICULTURAL STRUCTURES AND IMPLEMENTS.

J. S. GRAY..... Minneaolis
A. S. SWENSON..... St. Paul

COOKING AND PANTRY STORES.

MRS. ANNA B. UNDERWOOD..... Lake City
MRS. S. B. GREEN..... St. Anthony Park

APICULTURE.

DR. J. R. WALKER..... Leech Lake
MRS. J. W. BLACKWELL..... Alexandria

ORNITHOLOGY.

OTTO L. BULLIS..... Winnebago City
MRS. G. F. BENSON.....Lake City
ALBERT LANO.....Madison

ENTOMOLOGY.

J. S. HARRIS.....La Crescent
Dr. M. M. FRISSELLE.....Excelsior

LIFE MEMBERSHIP.

O. F. BRAND.....Faribault
DITUS DAY.....Farmington
A. W. LATHAM.....Excelsior

LEGISLATION.

J. H. STEVENS.....Minneapolis
WYMAN ELLIOT.....Minneapolis
F. G. GOULD.....Excelsior

METEOROLOGY.

PROF. C. W. HALL.....Minneapolis
F. M. CROSBY.....Hastings

ANNUAL MEMBERS.

Andrews, J. P., 1892.... Faribault
Allyn, Joshua, 1892.... Red Wing
Austin, L. E., 1891.... Leola, Dakota
Austin, J. W., 1892.... Hardy, Montana
Anderson, Erik, 1892.... Lake Park
Aldrich, C. C., 1892.... Morristown
Bunnell, M. C., 1892.... Newport
Bass, J. G., 1892.... Hamline
Busch, Fred., 1892.... Richfield
Barrett, J. O., 1892.... Browns Valley
Bost. A. A., 1891.... Excelsior
Brown, C. F., 1892.... St. Peter
Buck, Daniel, 1892.... Mankato
Bohanon, S. L., 1891.... Minneapolis
Bonniwell, Mrs. Annie, 1892.... Hutchinson
Burnett, Frank, 1892.... Belmont, Manitoba
Bailey, J. E., 1891.... Minneapolis
Barge, Jacob, 1891.... Minneapolis
Beardsley, B. F., 1892.... Excelsior
Baston, J. J., 1892.... St. Louis Park
Brown, F. S., 1892.... Tracy
Brackett, A. H., 1892.... Minneapolis
Bentley, A. C., 1891.... Stillwater
Buckendorf, Henry, 1891.... Minneapolis
Brown, J. G., 1891.... Perry, Iowa
Bliss, E. A., 1891.... Long Lake
Byewatters, E. E., 1891.... Great Falls, Montana
Brown, Wm., 1891.... Sand Coulee, Montana
Bradford, Donald, 1891.... Helena, Montana
Broberg, Andrew, 1891.... Waconia
Bitzen, August, 1891.... Kandiyohi
Bryson, Mrs. A., 1892.... Owatonna
Buck, Willard, 1892.... Alexandria
Barrett, N. W., 1892.... Clearwater
Bisbee, John, 1892.... Madelia
Bush, J. E., 1892.... Truly, Montana
Cook, M. W., 1892.... Rochester
Cutler, M., 1892.... Sumter
Cuzner, E. A., 1892.... Essex and 27th Av. S. E., Minneapolis
Crandall, Ethan, 1892.... Sumter
Corlett, J. E., 1892.... Farmersburg, Iowa
Chandler. E. M., 1892.... Minneapolis
Cook, Dewain, 1892.... Windom
Crosby, F. M., 1892.... Hastings
Cross, Mrs. E., 1892.... Sauk Rapids
Crane, H. L., 1892.... Excelsior
Clutton, C., 1891.... Watertown, S. D.
Callar, E. L., 1891.... Vermillion, S. D.
Chandler, Gilbert, 1892.... Minneapolis

Crooker, E. B., 1891 ..... Minneapolis
Crooker, Mrs. E. B., 1891 ..... Minneapolis
Cummings, J. R., 1892 ..... Eden Prairie
Cutts, E. J., 1892 ..... Howard Lake
Caswell, A. M., 1892 ..... Litchfield
Case, J. F., 1892 ..... Eau Claire, Wis.
Cairns, Thos. C., 1891 ..... Portland, Ore.
Craig, H. E., 1891 ..... St. Paul
Claggett, J. R., 1891 ..... Hastings
Christenson, P. H., 1891 ..... Manannah
Curtis, M. M., 1892 ..... Marshall
Church, C. H., 1892 ..... Owatonna
Chanter, C. A., 1892 ..... Kilbourne City, Wis.
Carleson, C. T., 1892 ..... 927, 14th St. S., Minneapolis
Curran, W. H., 1892 ..... 406, Lumber Exchange, Minneapolis
Day, Ditus, 1892 ..... Farmington
Day, L. E., 1892 ..... Farmington
Doughty, J. Cole, 1892 ..... Lake City
Danforth, Wm., 1892 ..... Red Wing
Dennis, A. B., 1891 ..... Cedar Rapids, Iowa
Dick, Francis, 1891 ..... Afton
Deletraz, G. F., 1892 ..... Fort Benton, Montana
Dobson, Wm., 1891 ..... Minnetonka Mills
Doyle, W. W., 1891 ..... Red Wing
Dunbar, C. S., 1891 ..... Banks
Doudna, J. M., 1892 ..... Alexandria
Fuller, G. W., 1891 ..... Litchfield
Frisselle, Dr. M. M., 1892 ..... Excelsior
Fiedler, F. H., 1892 ..... Perham
Furber, J. T., 1892 ..... Madelia
Featherstone, J. S., 1891 ..... Hastings
Ferguson, J. A., 1891 ..... Minneapolis
Featherstone, A. H., 1891 ..... Red Wing
French, W. S., 1892-93 ..... Slayton
Freund, J., 1892 ..... Blue Earth City
Fallet, Dennis, 1891 ..... Hastings
Fleckten, Victor, 1891 ..... Kandiyohi
Ford, J. W., 1892 ..... Owatonna
Ford, F. E., 1892 ..... Glencoe
Gould. Mrs. F. G., 1891 ..... Excelsior
Gilmore, J. F., 1891 ..... Richfield
Gray, J. S., 1891 ..... Minneapolis
Gilbert, F. A., 1891 ..... Beardsley
Gustafson, Charles, 1892 ..... Worthington
Green, Prof. S. B., 1892 ..... St. Anthony Park
Gilfillan, C. O., 1892 ..... Morgan
Giles, G. W., 1891 ..... Zumbrota
Goodrich, G. E., 1891 ..... Great Falls, Montana
Goertz, H. P., 1892 ..... Mountain Lake
Gibbs, F. H., 1891 ..... St. Anthony Park
Glaeser, Jacob, 1891 ..... Owatonna

Goodell, Mrs. H. M., 1892.....Owatonna
Hendrickson, W. G., 1891.....Hamline
Hawkinson, Charles, 1892..... Box 495, Minneapolis
Harris, F. I., 1891.....La Crescent
Harris, E. E., 1891.....La Crescent
Hall, Prof. C. W., 1892..... Minneapolis
Hillman, S. D., 1892.....Minneapolis
Heideman, C. W. H., 1892.....New Ulm
Hagen. O. J., 1892.....Hendrum
Howe, C. R., 1891.....Brooklyn Centre
Harris, H. C., 1891.....414 3d av. N., Minneapolis
Holmes, G. W., 1892..... Glencoe
Hays, Prof. W. M., 1892..... Fargo, N. D.
Hurt, O. I., 1892.....Island Lake
Hutchinson, Vincent, 1891.....Red Wing
Hansen, Ivar, 1892.....816 11th av. N., Minneapolis
Hunt, L. P., 1891.....Mankato
Harries, W. H., 1891.....Caledonia
Hunter, John, 1891..... Anoka
Hetherington. G. J., 1891.....Hastings
Harrington, D. F., 1892..... ...Adrian
Heins, H. H., 1892.....Lydia
Hawks, Samuel, 1892.....Waseca
Haupt, F. S., 1892.....Albert Lea
Hadskis, G. H., 1892.....Winnepeg, Manitoba
Haseltine, E. W., 1892.....Grand Forks, N. D.
Hauge, L. J., 1892.....Elbow Lake
Holmes, W. H., 1892.....Davenport, Iowa
Hunter, H. R., 1892.....Sioux Falls, S. D.
Hillstrom, Theodore, 1892..... East Union
Hanson, J. P., 1892.....Hastings
Ince, J. C., 1891.....Maple Glen
Imerson, Mrs. Cynthia A., 1892..... St. Paul
Jessup, G. H., 1892.....Tracy
Jenness, B. F., 1891.....Willmar
Jones, Aaron, 1892.....Canova, S. D.
Jefts, Mrs. Charles, 1892.....Owatonna
Johnson, A. A., 1892.....Winnebago City
Jacobson, S., 1892.....Tordenskjold
Kramer, J. C., 1892.....La Crescent
Knapheide, Rudolph, 1892.....St. Paul
Kenney, S. H., 1892.....Morristown
Kennedy, Mrs. A. A., 1892.....Hutchinson
Kilbourne, F. M., 1891.....Lakeville
Keel, R. C., 1892.....Rochester
Kilgore, W. W., 1891.....Marshall
Kerr, T. P., 1892.....Princeton
Koempel, Frank, 1891.....775 Marshall Av., St. Paul
Kneeland, N. C., 1892.....Plainview
Kimball, F. W., 1892.....Austin
Lyons, Wm., 1892.....2924 Clinton Av., Minneapolis

Lord, O. M., 1892.....Minnesota City
Libbey, Howard, 1891.....Red Wing
Little, John, 1891.....Granton, Ontario
Lory, H. A., 1892.....Maple Ridge
Lundwall, Nelson, 1891.....Bozeman, Montana
Longsdorf, W. H., 1892.....Lake City
Levens, C. W., 1891.....Albert Lea
Long, A. G., 1892.....Excelsior
Lyons, Miss Mattie, 1892.....2924 Clinton Av., Minneapolis
Lyman, H. M., 1892.....Excelsior
Lafot, Edward, 1892.....Lakefield
Lee, G. J., 1891.....Chippewa Falls, Wis.
Ludlow, H. J., 1892.....Worthington
Lynne, Lars, 1892.....Elbow Lake
Lucknow, Charles, 1892.....Minneapolis
Lehman, Charles, 1892.....Mound Prairie
McKinstry, A. W., 1892.....Faribault
McKellip, C. D., 1892.....Faribault
Mills, L. D., 1891.....Garden City
Mackintosh, Wm., 1892.....Langdon
Mackintosh, R. S., 1892.....Langdon
Merrill, D. D., 1892.....St. Paul
Moyer, L. R., 1892.....Montevideo
May, L. L., 1892.....St. Paul
Morris, W. H., 1892.....Excelsior
Murray, J. W., 1892.....Excelsior
Malmquist, Gust, 1892.....Fair Oaks, Minneapolis
Myers, D. E., 1892.....St. Cloud
Mendenhall, H. W., 1891.....Rapidan
Mills, F. B., 1891.....1820 Nicollet Av., Minneapolis
Mills, Fred, 1891.....Minneapolis
Morgan, R. C., 1892.....Goodhue
McMillan, D., 1891.....Edna
McCool, John, 1891.....Barry
McRastie, Mrs. J. H., 1892.....Owatonna
Moore, G. W., 1892.....Buffalo
Marston, Perrin, 1892.....Winnebago City
Malcolm, H. W., 1892.....Minneapolis
Mitchell, Timothy, 1892.....Hastings
Marschall, Peter, 1892.....Hastings
Murdock, Dr. H. M., 1892.....New Richmond, Wis.
Norquist, John, 1892.....Red Wing
Norswing, K. B., 1892.....Holden
Nordquist, O. A., 1892.....St. Paul
Nelson Bros., 1891.....Great Falls, Montana
Noehl, John, 1892.....Kasson
Neil, O. H., 1892.....Holden
Olson, P. M., 1891.....Bratsberg
Older, C. E., 1891.....Luverne
Ofstedahl, Rev. N. A., 1892.....Holden
Ofstedahl, Rev. A., 1892.....Fertile
Oien J. O., 1892.....New Richland

Porter, Prof. E. D., 1891 ..... Columbia, Mo.
Porter, J. F., 1892 ..... Red Wing
Parker, W. L., 1892 ..... Farmington
Puffer, Dr. F. L., 1892 ..... Bird Island
Partridge, Sam, 1892 ..... Hamline
Pendergast, Prof. W. W., 1892 ..... Hutchinson
Pennell, Prof. C. S., 1892 ..... St. Anthony Park
Pond, E. R., 1892 ..... Bloomington
Piersons. C. O., 1891 ..... Lester
Powell, F. M., 1892 ..... Glenwood, Iowa
Powell, M. E., 1891 ..... St. Peter
Perkins, T. E, 1891 ..... Red Wing
Plants, D. V., 1891 ..... Long Lake
Pancoast, W. H., 1891 ..... Bloomington
Perkins, W. F., 1891 ..... Camden Place, Minneapolis
Parry, C. M., 1892 ..... 523 Guaranty Loan Building, Minneapolis
Pracna, F. J., 1892 ..... 117 Main St. S. E., Minneapolis
Prescott, G. H., 1892 ..... Albert Lea
Perry, P. H., 1892 ..... Excelsior
Payne, C. E., 1892 ..... Dexter
Peschong, Peter, 1892 ..... Odebolt, Iowa
Purchase, J. R., 1892 ..... Excelsior
Peterson, J. A., 1892 ..... Fair Oaks, Minneapolis
Peart, T., 1892 ..... Mankato
Richardson, S. D., 1892 ..... Winnebago City
Roe, A. D., 1891 ..... Stillwater
Rogers, Dr. A. C., 1892 ..... Faribault
Richardson, W. F., 1892 ..... Winnebago City
Redpath, Thomas, 1892 ..... Minneapolis
Rice, W. C., 1892 ..... 439 Clinton av., St. Paul
Ridley, John, 1892 ..... Burr Oak, Iowa
Stubbs, N. J., 1891 ..... Markville
Somerville, Wm., 1892 ..... Viola
Solem, Rev. O. A. Th., 1892 ..... Halstad
Smith, C. A., 1891 ..... 77, 7th St. S., Minneapolis
Strandwold, Ole, 1891 ..... Trysil, Dakota
Scott, W. G., 1892 ..... Winnepeg, Manitoba
Sampson, C. W., 1892 ..... Excelsior
Sampson, J. A., 1892 ..... Excelsior
Street, A. H., 1891 ..... Alden
Sargent, C. A., 1892 ..... Red Wing
Sundberg, C. A., 1892 ..... Worthington
Seamens, W. D., 1891 ..... Viola
Sharp, Dr. L. N., 1892 ..... Minneapolis
Somerville, L. E., 1891 ..... Viola
Sewall, Mrs. Ida C., 1892 ..... St. Anthony Park
Sprague, Mrs. D. W., 1891 ..... 1116 Hawthorne Av., Minneapolis
Schmauss, F. J., 1891 ..... Lake City
Stearns, C. H., 1891 ..... Zumbrota
Shogren, E., 1891 ..... Red Wing
Shaubut, Mrs. J. J., 1892 ..... Cheney, Kan
Smith, James, 1891 ..... Brookings, S. D.

Schultz, L., 1891.....Sutton
Sackett, D. P., 1892.....Fairmont
Smith, Mrs. C. A., 1892.....Owatonna
Smith, G. H., 1892.....Long Lake
Scherlie, H. A., 1892.....Dundee
Sexton, C. W., 1892.....13 Washington Av. N., Minneapolis
Stevenson, A. P., 1892.....Nelson, Manitoba
Simmons, F. A., 1892.....Hastings
Tibbetts, M. L., 1891.....Dover Center
Turnbull, John, 1892.....La Crescent
Taylor, Barnett, 1892.....Forestville
Tanner, Wm., 1891.....Cannon Falls
Terry, Alfred, 1892.....Slayton
Thayer, Mrs. P. A., 1891.....Sauk Rapids
Trenham, N. J., 1892.....Alexandria
Turner, John, 1892.....Shakopee
Taylor, Jewell, 1891.....Forestville
Taylor, Joseph, 1891.....Fairview and Lincoln Avs., St. Paul
Thain, J. G., 1891.....Highwood, Montana
Taylor, W. L., 1891.....Litchfield
Trout, Henry, 1892.....Farmington
Thom, R. C., 1892.....Owatonna
Terrill, H. A., 1892.....Shelden, Iowa
Thompson, Harvey, 1892.....Windom
Taughtes, M. C., 1892.....Hastings
Uderwood, J. M., 1892.....Lake City
Underwood, Mrs. Anna B., 1892.....Lake City
Urie, Wm., 1891.....2520 Bryant Av. N., Minneapolis
Van Armen, C. C., 1891.....Owatonna
Wachlin, Wm., 1892.....Faribault
Wedge, Clarence, 1892.....Albert Lea
Ward, C. W., 1891.....Sumter
Wilcox, L. H., 1892.....Hastings
Wickersheim, W. J., 1892.....Idlewild
Weston, G. A., 1892.....Faribault
Walton, A. L., 1891.....Wabasha
Wing, Henry, 1891.....Aspelund
Weiland, Theodore, 1891.....Shakopee
Woehle, B., 1892.....Iona
Wyman, Guy A., 1891.....Minneapolis
Ward, W. O., 1891.....Bismark, N. D.
Willford, Wm., 1892.....Canton
Ware, Eugene, 1892.....Owatonna
Wilkinson, C. B., 1892.....Owatonna
Wood, Joseph, 1892.....Windom
Wentworth, David, 1892.....Hastings
Willis, F. D., 1892.....13 Chamber of Commerce, St. Paul
Willford, F. W., 1892.....Canton
Yancey, B. C., 1892.....Edna Mills
Zatterstrom, J. F., 1891.....Spencer Brook
Zenner, Peter, 1892.....Caledonia

LIFE MEMBERS.

Herzog, Philip.....Chowen
Manda, W. A.....Short Hills, N. J
Nagel, Eggert.....1118 W. Lake St., Minneapolis
Wheaton, D. T.....Morris

HONORARY MEMBERS.

HONORARY LIFE MEMBERS.

Budd, Prof. J. L.....Ames, Ia
Bowen, Mrs. Jas.....Minneapolis
Brand, O. F.....Faribault
Coleman, Hon. N. J.....St. Louis, Mo
Cleveland, Prof. H. W. S.....Minneapolis
Corp, Sidney.....Hammond
Dartt, E. H. S.....Owatonna
Elliot, Wyman.....Minneapolis
Ford, L. M.....San Diego, Cal
Grimes, J. T.....3209 Nicollet Ave., Minneapolis
Gideon, P. M.....Excelsior
Gibbs, Jr., Oliver.....Ramsey, S. D
Gould, F. G.....Excelsior
Harris, J. S.....La Crescent
Lacey, Chas. Y.....Fort Benton, Mon
Luedloff, Chas.....Carver
Latham, A. W.....Excelsior
Manning, J. W.....Boston, Mass
Manning, Mrs. J. W.....Boston, Mass
Mendenhall, R. J.....Minneapolis
Manning, Miss Sara M.....Lake City
Peffer, Geo. P.....Pewaukee, Wis
Plumb, J. C.....Milton, Wis
Phoenix, F. K.....Delavan, Wis
Paist, Mrs. Wm.....Hersey
Pearce, M.....Chowen
Peterson, Andrew.....Waconia
Robertson, Col. D. A.....St. Paul
Smith, J. M.....Green Bay, Wis
Stevens, Col. J. H.....Minneapolis
Smith, Truman M.....San Diego, Cal
Sias, A. W.....Pueblo, Cal
Smith, C. L.....Minneapolis
Sargeant, Mrs. H. B.....Lake City
Tuttle, A. C.....Baraboo, Wis
Tilson, Mrs. Ida E.....West Salem, Wis
Van Cleve, Mrs. C. O.....603 SE 5th St., Minneapolis
Wilcox, E.....La Crosse, Wis

HONORARY MEMBERS FOR ONE YEAR.

Stillwell, Z. B .....Eau Claire, Wis
Case, J. F .....Eau Claire, Wis
Culbertson, W. R .....Eau Claire, Wis
Sperry, Mrs. W. A .....Owatonna
McRastie, Mrs. J. H .....Owatonna
Roberts, Dr. D. H .....Owatonna

HONORARY MEMBERS FOR FIVE YEARS.

J. S. B. Thompson, elected 1888 .....Grundy Center, Ia
Miss Edith A. Kellogg, elected 1888 .....Janesville, Wis
Prof. W. H. Ragan, elected 1889 .....Greencastle, Ind
Mrs. V. H. Campbell, elected 1889 .....Evansville, Wis
A. J. Phillips, elected 1889 .....West Salem, Wis
Elmer Reeves, elected 1889 .....Waverly, Ia
Thos. Frankland, elected 1889 .....Stonewall, Man
C. C. Bell, elected 1889 .....Booneville, Mo
Frank Burnett, elected 1890 .....Glenboro, Man
Mrs. Frank Burnett, elected 1890 .....Glenboro, Man
Edson Gaylord, elected 1891 .....Nora Springs, Ia
Prof. C. B. Waldron, elected 1891 .....Fargo, N. D
M. A. Thayer, elected 1891 .....Sparta, Wis
G. J. Kellogg, elected 1891 .....Janesville, Wis
J. B. Mitchell, elected 1892 .....Cresco, Ia
C. H. Hamilton, elected 1892 .....Ripon, Wis

LIST OF PAPERS ADVERTISING THE WORK OF THE SOCIETY IN 1891.

The following newspapers run a notice gratuitously, for from one to three months, calling the attention of the public to the work of our society. Most of the newspapers solicited complied at once with our request.

Dodge Co. Republican, Kasson, Minn.
Farmington Tribune, Farmington, Minn.
Mankato Free Press, Mankato, Minn.
Barnesville Weekly Review, Barnesville, Minn.
Dodge Co. Record, Dodge Centre, Minn.
Blue Earth City Post, Blue Earth City, Minn.
Northwestern Agriculturist, Minneapolis, Minn.
Douglas Co. News, Alexandria, Minn.
The Aitken Age, Aitken, Minn.
Sauk Rapids Sentinel, Sauk Rapids, Minn.
Rush City Post, Rush City, Minn.
Carver Co. News, Waconia, Minn.
Sleepy Eye Dispatch, Sleepy Eye, Minn.
Mantorville Express, Mantorville; Minn.
Advance, Springfield, Minn.
Moorhead Weekly News, Moorhead, Minn.

OFFICERS

OF THE

MINNESOTA STATE AGRICULTURAL SOCIETY,

FOR THE YEAR 1892.

PRESIDENT.

J. H. BURWELL.....St. Paul.

FIRST VICE PRESIDENT.

COL. J. H. STEVENS.....Minneapolis.

SECOND VICE PRESIDENT.

ED. WEAVER.....Mankato.

SECRETARY AND GENERAL MANAGER.

W. F. CROSS.....Red Wing.

ASSISTANT SECRETARY.

SAM. PARTRIDGE.....Hamline.

TREASURER.

FRANK J. WILCOX.....Northfield.

BOARD OF MANAGERS.

CLARK CHAMBERS.....Owatonna.
C. N. COSGROVE.....Le Sueur.
WM. M. LIGGETT.....Benson.
J. J. FURLONG.....Austin.
W. R. TANNER.....Moorhead.
J. H. LETSON.....Alexandria.

*** The State Fair for 1892 will be held on the grounds at Hamline, September 5, 6, 7, 8, 9, 10th. The management pledge themselves to make and invite the co-operation of agriculturists, horticulturists, and others to help in making this year's fair the best ever held. Liberal premiums are offered in every department. For any information address the Secretary, Hamline, Minn.

CONSTITUTION

OF THE

MINNESOTA STATE HORTICULTURAL SOCIETY.

ARTICLE 1.

NAME.

This society shall be known as the Minnesota State Horticultural Society.

ARTICLE II.

OBJECT OF THE SOCIETY.

The object of this society shall be to improve the condition of pomology, horticulture and arboriculture, by collecting and disseminating correct information concerning the culture of such fruits, flowers, trees and other productions in horticulture as are adapted to the soil and climate of Minnesota.

ARTICLE III.

MEMBERSHIP.

Any person may become a member by paying to the secretary or treasurer an annual fee of one dollar, or a life member by the payment of ten dollars, provided that life members may pay the fee of ten dollars in two equal annual payments of five dollars each.

Local or county horticultural societies and kindred organizations may become auxiliary to this society by sending three delegates to the annual winter meeting, who shall be entitled to all the rights and privileges of membership upon furnishing to the secretary of this society a list of members of their society and a report of the proceedings thereof.

Honorary members, for a time stated or for life, may be elected at any annual meeting by a two-thirds vote of the society.

ARTICLE IV.

OFFICERS.

Its officers shall consist of a president, one vice-president from each congressional district, a secretary, a treasurer, an executive committee of five, and a librarian.

ARTICLE V.

DUTIES OF PRESIDENT AND VICE-PRESIDENTS.

The president shall preside at and conduct all meetings of the society, and deliver an annual address, and in his absence the vice-presidents, in their order, shall perform the same duties. They shall also have a general supervision of the horticultural interests in their respective districts, and make a written report to the society at its annual winter meeting; in consideration of which the society shall pay their traveling expenses to the same.

ARTICLE VI.

THE SECRETARY.

The secretary shall record all the doings of the society, collate and prepare all communications, etc., for the public press, and pay over all moneys received from members or otherwise to the treasurer on his receipt; receive and answer all communications addressed to the secretary, establish and maintain correspondence with all local, county, district and state horticultural societies, and secure by exchange their transactions, as far as possible; aid the president as an executive officer in the dispatch of business relating to the meetings of the society, take notice of horticultural and similar meetings of general interest, and report to the annual meeting of the society an abstract of the matter that has come into his possession, which, with its approval, shall become part of its transactions of the current year.

ARTICLE VII.

THE TREASURER.

The treasurer shall collect and hold all funds of the society, and pay out the same only on the order of the president, countersigned by the secretary. He shall make up a report of all the receipts and disbursements of the society and present the same at the annual winter meeting, or at any other time when called upon to do so by the executive committee. He shall give

bonds in such sums as the society may direct, to be approved by the president and secretary, and the bond when so approved shall be filed with the state auditor.

ARTICLE VIII.

ELECTION OF OFFICERS.

The officers shall be elected separately and annually by ballot and hold their offices until their successors are elected.

ARTICLE IX.

MEETINGS OF THE SOCIETY.

The society shall hold annual sessions on the second Tuesday of January, and other meetings at such time and place as the society may direct.

ARTICLE X.

THE LIBRARIAN.

The librarian shall have charge of the library and report its condition at each annual meeting.

ARTICLE XI.

AMENDMENTS.

By-laws and alterations of the constitution for the purpose of meeting the future wants of the society, may be enacted by a vote of two-thirds of the members present at any regular annual meeting, and on one day's notice of the same being given.

BY-LAWS.

1. The president, at each annual meeting of the society shall appoint a general fruit committee, consisting of two members from each congressional district in the state, and it shall be the duty of each member to make a written report annually upon the fruit crop, and a limited list of fruits best adapted for general cultivation in their respective districts.

2. The president, secretary and treasurer shall be members *ex-officio* of the executive committee, who shall have charge of all matters pretaining to the interest of the society.

3. The executive committee may call a meeting of the society at any time they may deem advisable, giving at least thirty days' notice through the public press.

4. The executive committee shall appoint a committee on seedlings, on nomenclature, on forestry, on fruit blossoms, on Russian apples, on gardening, on small fruits and on floriculture.

5. The five members of the executive committee, not including the president, secretary or treasurer, shall be a committee on finance, and it shall be their duty to audit all bills before they shall be ordered to pay by the president and secretary.

6. The executive committee shall see that a program is issued for each meeting of the society, at least one month before the winter meeting and ten days before the summer meeting.

7. Every member shall be entitled to one copy of the transactions as often as published, on which postage shall be paid; but in distribution of all other copies the party receiving the same shall pay the postage. Where several copies are sent to auxiliary societies it shall be discretionary with the secretary to pay the freight.

8. *Quorum.*—A quorum shall consist of nine members of the society, or a majority of the executive committee.

RULES FOR NAMING FRUITS.

RULE 1. The originator or introducer (in the order named), has the prior right to bestow a name upon a new or unnamed fruit.

RULE 2. The society reserves the right, in case of long inappropriate, or otherwise objectionable names, to shorten, modify, or wholly change the same, when they shall occur in its discussions or reports; and also to recommend such changes for general adoption.

RULE 3. The names of fruits should preferably express as far as practicable, by a single word the characteristics of the variety, the name of the originator, or the place of its origin. Under no ordinary circumstances should more than a single word be employed.

RULE 4. Should the question of priority arise between different names for the same variety of fruit, other circumstances being equal, the name first publicly bestowed will be given the precedence.

RULE 5. To entitle a new fruit to the award or commendation of the society, it must possess (at least for the locality for which it is recommended) some valuable or desirable quality or combination of qualities, in a higher degree than any previously known variety of its class and season.

RULE 6. A variety of fruit, having been once exhibited, examined and reported upon as a new fruit, by a committee of the society, will not thereafter be recognized as such, so far as subsequent reports are concerned.

Suggestion:—That Rule 6 shall not be construed to mean that a new seedling variety, having been exhibited, examined and reported upon, shall not be eligible to compete for any special prize offered by this society that requires two or more exhibitions before the final award is made.

RECORD OF THE PROCEEDINGS OF THE EXECUTIVE COMMITTEE, FOR THE YEAR ENDING JAN. 22, 1892.

RECORD OF MEETING HELD IN MINNEAPOLIS, JAN. 23, 1891.

Meeting called to order by J. M. Underwood, Chairman, all the members being present.

Messrs W. Elliot, L. H. Wilcox and F. G. Gould were appointed a committee to attend to all legislation in the interest of the Horticultural Society.

The following was adopted:—Resolved, that we recommend the committee on legislation to use their efforts to secure the printing of 20,000 copies of a book of about 100 pages, to be called "Hand Book of Horticulture in Minnesota," the material for such book to be selected from the reports of the Minnesota State Horticultural Society.

Moved and adopted that the next meeting of the executive committee be held at President Elliot's office in Minneapolis, February 24, 1891. Adjourned *sine die.*

A. W. LATHAM, Secretary.

RECORD OF MEETING HELD FEBRUARY 17, 1891, AT THE OFFICE OF WYMAN ELLIOT, MINNEAPOLIS.

Meeting was called to order by the chairman, J. M. Underwood, at 10 o'clock A. M.

Present at the opening, Messrs. W. Elliot, J. M. Underwood, J. S. Harris, O. F. Brand, D. Day and A. W. Latham; M. Cutler coming in an hour after.

The minutes of the last meeting were read and approved.

The committee on legislation reported progress and was continued.

The following regular committees were appointed for the year 1891: (for these committees see printed report of 1891.)

Moved and carried that the committee on library shall collect books etc., for benefit of the library and report at next meeting.

Moved and carried that the appointments of superintendents of experiment stations be made by a committee consisting of S. B. Green, W. Elliot and A. W. Latham.

Moved and carried to recommend the appointment of Mr. C. M. Loring of Minneapolis as commissioner to have charge of the exhibit from Minnesota at the Columbian Exposition.

Moved and carried to recommend the appointment of A. W. Latham, of Excelsior, as Superintendent of the horticultural department of the Minnesota exhibit, at the Columbian Exposition.

A committee consisting of J. M. Underwood, Wyman Elliot and F. G. Gould, was appointed to urge upon the proper authorities the adoption of these recommendations as to appointments for the Minnesota exhibit at the Columbian Exposition.

The secretary and treasurer were instructed to examine S. D. Hillman's accounts with the society and report.

It was decided to hold the summer meeting for 1891 at the State Agricultural Farm, and at that time to bring up for discussion the advisability of changing the method of holding summer meetings.

The president, W. Elliot, was instructed to send a telegram to Geo. R. Davis, Director General of the Columbian Exposition, recommending the appointment of J. D. Reynolds as superintendent of the horticultural department at that exposition.

Moved and carried that the amount to be expended for premiums at the coming summer meeting be the same as last year, and the arrangement of the premium list be left to the president and secretary.

The following bills were audited and allowed:

No. 53,	W. Elliot, Expenses of annual meeting.....	$5.00
No. 54,	Price Bros., Printing for " "	4.00
No. 55,	N. E. Furniture Co., Expenses for annual meeting	5.00
No. 56,	Drennen & Co., " " " "	1.72
No. 57,	A. W. Latham, Secretary's supplies.....	13.18
No. 58,	J. S. Harris, Expenses at meeting of Executive Com.	7.00
No. 59,	D. Day, " " " "	2.29
No. 60,	O. F. Brand, " " " "	4.24
No. 61,	M. Cutler, " " " "	3.75
No. 62,	J. M. Underwood, " " "	4.50

Adjourned *sine die*.

A. W. LATHAM, Secretary.

RECORD OF MEETING HELD JUNE 4, 1891, AT MASONIC TEMPLE, MINNEAPOLIS.

Meeting was called to order at 12 M., by the chairman, J. M. Underwood, all members being in attendance except L. H. Wilcox.

It was decided to hold the annual summer meeting at the State Agricultural Farm, July 15, 1891; this date, however, to be subject to change, at the discretion of the president, secretary, and Prof. S. B. Green.

The president and secretary were instruced to draw upon the treasurer for an amount sufficient to pay for the use of Masonic Hall for the American Association of Nurserymen.

The president and secretary were authorized to revise the premium list for the summer meeting, adding to it raspberries, currants, gooseberries, and blackberries, and submit it to the members of the executive committee for approval.

Adjourned *sine die.*

A. W. LATHAM, Secretary.

RECORD OF MEETING HELD SEPTEMBER 11, 1891, AT THE STATE FAIR GROUNDS.

The members were all present. J. S. Harris was appointed delegate to the annual meeting of the American Pomological Society to be held at Washington, and $50 was appropriated for expenses.

It was decided to hold the next annual meeting at Owatonna, provided the citizens of that place furnish the usual entertainment.

An office for the use of the officers of the society was rented of Wyman Elliot, at $5.00 per month, located adjoining the office of Mr. Elliot, on Nicollet Avenue, in Minneapolis.

The president and secretary were instructed to fit up the office.

The president and secretary were authorized to prepare a program and premium list for the annual winter meeting, with the active co-operation of the executive committee, and publish it with their approval.

It was decided to allow the Bee-Keepers Association the use of one evening during the annual meeting.

Adjourned *sine die.*

A. W. LATHAM, Secretary.

RECORD OF MEETING HELD JANUARY 21, 1892, AT OWATONNA, MINNESOTA.

The meeting was called to order at 9 A. M., all members being present. It was decided to adopt the report submitted by the secretary in regard to the claim of Ex-Secretary Green versus Ex-Secretary Hillman, and the secretary was instructed to send a copy to S. D. Hillman.

The secretary was instructed to procure a photo-engraving of Ex-Secretary J. W. Harkness, to be published in the next annual report, in connection with that of Ex-President J. S. Harris. Mr. J. S. Harris tendered three old records relating to horticultural matters, which the secretary was instructed to have bound and placed in the library.

It was decided to offer the following recommendations to the society:

First.—That the Secretary be allowed a short hand reporter at a cost not to exceed $100.00 per annum.

Second.—That the constitution be changed, convening the annual meeting the second Tuesday in January.

Third.—That W. A. Manda, Short Hills, New Jersey, A. S. Swenson, St. Paul and E. Nagel, Minneapolis, be made life members.

Fourth.—That a permanent committee be created on life membership.

The following bills were audited:

M. C. Burr (paid in 1891)		$26.00
No. 1.	M. Cutler, expenses at the meeting of ex. com.	6.70
" 2.	J. M. Underwood, expenses at the meeting of ex. com.	3.20
" 3.	L. H. Wilcox, expenses at the meeting of ex. com.	5.00
" 4.	O. F. Brand, expenses at the meeting of ex. com.	1.54
" 6.	Dewain Cook, expenses as delegate to S. D. Horticultural Society	19.53
" 7.	F. C. Metcalf, desk for library	10.00
" 9.	Wyman Elliot, express on reports, etc.	2.77
" 10.	J. S. Harris, expenses at meeting of ex. com.	19.64
" 11.	Ditus Day, expenses at meeting of ex. com.	4 00

Adjourned *sine die.*

A. W. LATHAM, Secretary.

SUMMER MEETING.

NOTICE.

SUMMER MEETING OF THE MINNESOTA STATE HORTICULTURAL SOCIETY TO BE HELD AT THE STATE AGRICULTURAL FARM AT ST. ANTHONY PARK, MINNESOTA, FRIDAY, JULY 10, 1891.

The raspberry season has been selected as the time of this annual summer gathering, and it is hoped a large number of the members and friends of the society may be present to enjoy the occasion (not forgetting to bring along the ladies of the family to share in the pleasure and profit of the day).

The forenoon will be occupied in examining the grounds devoted to experimentation, renewing acquaintances, etc. At noon a basket picnic will be served, to which each is invited to contribute, not forgetting to bring a liberal supply of any fruits that are in season.

In the afternoon the society will hold a session devoted to short papers and talks upon subjects pertinent to the season, in which all are invited to participate.

Members who have short papers to present at this meeting are requested to notify the officers as soon as possible.

It is suggested that this will be a favorable opportunity to exhibit specimens of insects, fungi, etc., and to secure practical information from the State Entomologist, Prof. Otto Lugger, who will probably be present.

Arrangements will be made to meet trains arriving at St. Anthony Park during the forenoon and carry those in attendance to the State Farm.

For further particulars address

A. W. LATHAM,
Secretary, Excelsior.

WYMAN ELLIOT,
President, Minneapolis.

PREMIUM LIST.

[Articles exhibited must be grown by the exhibitor.]

FLOWERS.

	1st Prem.	2d Prem.
Collection of cut flowers	$5.00	$3.00
Collection of cut roses	3.00	2.00
Collection of cut pansies	3.00	2.00
Collection of cut carnations	3.00	2.00
Floral designs	5.00	3.00
Hand bouquet	2.00	1.00

FRUITS.

RASPBERRIES.—Collection of not less than three named varieties, one quart each	$3.00	$2.00
Largest fruit of any variety, one quart	2.00	1.00
Minnesota seedling, not before exhibited	2.00	1.00

A premium of $1.00 will be awarded for the best quart and 50 cents for the next best quart of each variety of merit exhibited.

BLACKBERRIES.—Same as for raspberries.

CURRANTS.—Same as for raspberries.

GOOSEBERRIES.—Same as for raspberries.

VEGETABLES.

Collection not less than 6 kinds	$3.00	$2.00
Asparagus, three bunches	1.00	.50
Beets, six	1.00	.50
Carrots, six	1.00	.50
Onions, six	1.00	.50
Radishes, six	1.00	.50
Turnips, six	1.00	.50
Pieplant, six stalks	1.00	.50
Lettuce, six heads	1.00	.50
Cabbage, three heads	1.00	.50
Cauliflower, three heads	1.00	.50
Green peas, ½ pk	1.00	.50
String beans, ½ pk	1.00	.50
New potatoes, ½ pk	1.00	.50
Cucumbers, six	1.00	.50
Summer squash, six	1.00	.50

RULES.

The awarding committee shall complete its work and report to the society at twelve o'clock M. It will have power to recommend special premiums for seedlings, and articles of special merit, fruits, flowers or vegetables, not provided for in the schedule of premiums. *Premiums will not be awarded to articles unworthy of exhibition, even if there is no competition.*

Competition will be open to all, but the annual membership fee of one dollar will be deducted from premiums awarded to persons who are not members of the society.

RECORD OF SUMMER MEETING.

Pursuant to notice, the summer meeting was held at the Experiment Station, St. Anthony Park, July 10, 1891. An unusually large number, about seventy-five, were present, and the exhibition of flowers, fruits, and vegetables was unexpectedly fine. The forenoon of the day was occupied in examining the buildings and grounds of the Experiment Station, in social converse, and in interchange of friendly greetings.

At the noon hour the members gathered around the picnic board and discussed a very interesting lunch, including most of the varieties of fruit on exhibition.

At one o'clock p. m., the formal summer meeting of the society was called to order by the president, Wyman Elliot.

J. O. Barrett, from Brown's Valley, Secretary of the State Forestry Association, read the following paper.

CLAIMS OF THE FORESTRY EXHIBIT AT THE WORLD'S FAIR.

J. O. BARRETT, BROWNS VALLEY.

Although forestry and horticulture are inseparable in uses, it is better that each organization work on its special line. We who are members of both have so determined. We should therefore plan for the success of both at the World's Fair. In a popular sense forestry is the weaker of the twins; it should therefore in justice have some extra attention from the sister that is stronger, and that has so faithfully carried her brother in her fostering arms. At least the Horticultural Society should relinquish to forestry all that legitimately belongs to it. Allow me to define where I think the line of distinction should be drawn as to what is forestal and what horticultural:

By forest flora I mean not only timber trees for timber purposes, but all trees that naturally grow in and belong to the native forest. This is not all. The shrubs, vines, flowers, grapes, ferns, "Reeds and rushes, O," and all other wild vegetations that live in companionship with forested trees belonging in the category of forest flora, should be handed over to the Forestry Association. The horticultural fruit plants had their origin in the forest, or were the derivitives of the wild. Culture has developed the "fittest." Horticulture is entitled to all the cultivated plants and fruits for exibition, but nothing wild from Minnesota. There now! Horticulture is the more exalted, more advanced, more enriched phase of forest flora. I will concede to her the right to Eden occupancy, and there she must stay and not steal anything that the nymphs and naiads possess in the native woods outside. Let mistress horticulture be modest and honest; she has no chance for glorification over the wild and native so long as her highness has to fall back to first germinal principals when her civilizing process has educed diseased conditions.

If now we understand each other, let me in brief outline the forestry exhibit at the World's Fair. We propose to have specimens of all the principal timber and ornamental trees of Minnesota, an ample supply of each specimen and variety—some in rough blocks, some polished and all tastefully arranged. As suggested to me by C. L. Smith, we had better

have some rare pieces of furniture, such as center tables, floral stands, bureaus and the like, composed each of different specimens of our woods, polished across and with the grain, and thus glued together for variegated surfaces. To this end we shall need to enlist the co-operation of all the lumbermen, furniture manufacturers, pulp men, veneering men, and other wood factory men in the state, to help furnish something practical and beautiful, with personal credit to the donors, of course. It occurs to me that we could have thin sheets of our different woods cut into book leaves and handsomely bound. An imprint can be made upon the polished side of each leaf, descriptive of its corresponding wood and its practical use. After the Fair, these should be tendered back to the state to be preserved safe for generations to come, in our library archives. Also, that we have two monuments, say fifteen or more feet high, constructed from blocks of our woods, carved and polished, round or square, glued or riveted upon each other in perfect monument style, one dedicated to Columbus, lettered with his dates and discoveries, the other dedicated to the pioneers of Minnesota, their records engraved or printed on them, beginning at the base with the first explorer and thence upward—Nicollet, Catlin, and their contemporaries, Renville, Riggs, Joe Brown, Gen. H. H. Sibley, Col. John H. Stevens, and so on to the end of the chapter; each in his order, each block symbolic of character as near as possible. This would be a valuable and venerable monument to be kept in the House of Representatives as a perpetual reminder of the early days of valor and sacrifice. I also suggest a unique cabinet made of our woods in which to exhibit specimens of our forest leaves, flowers, seeds, etc.; also a miniature of Minnehaha Falls.

Aside from all these exhibits, we can have wild vines arching over dripping caves and grottoes; a brook babbling over bright pebbles and mossy rocks, with lilies and minnows in the little pools, groups of young living trees, budding, leaving, blossoming, fruiting; birds and birds' nests; in the rear perhaps a miniature log cabin, with its wierd and uncouth environment. These are but some of the ideal scenery to be added to and varied as the space and privileges may allow when we get there. As suggested by President Elliot, we also propose to have a large map representing the zones or belts and groups of our forest flora—something to study and admire—something to study in the future. For a hand book we propose a neat pamphlet, descriptive of the forest flora of Minnesota, including our water system as a factor of growth. It is difficult to put in words what artistic hands can do in this exhibit to make it equal to that of any other state, if not excelling. Let me mention here the three trunk trees which Minnesota is to furnish for the grand colonade to the Forestry Building. These are to be mighty pillars of ash or maple, oak and pine, and when you pass them to the Minnesota forestry exhibit, doff your hat in joyful reverence. This will be the royal way of entrance to our native woods at the Columbian Exhibition.

One thing more—the Forestry Association has just doubled its exhibitional price, soliciting $10,000, and is willing to concede to and work for the Horticultural Society to the tune of $15,000, with $25,000 in hand, and we all must help raise it, with a co-operative energy, we can scientifically and practically advertise our Minnesota before the world, and demonstrate that in forest flora and horticultural excellence she takes the prize.

J. O. BARRETT,
Secretary of the Forestry Association.

Col. J. H. Stevens, of Minneapolis, made an eloquent plea for the co-education of sexes at the State Farm School, urging that the same privileges that have heretofore been accorded to boys be provided for the girls of Minnesota.

Prof. E. D. Porter of Columbia, Missouri, formerly director of the schools, made a few happy remarks, reminiscent of the founding of the Farm School and along the line pursued by Col. Stevens.

Remarks were made by J. S. Harris, of La Crescent, on the same subject.

Upon motion of Col. Stevens, the president and secretary of the society, together with J. S. Harris, were appointed a committee to correspond with the regents of the State University, urging equal privileges for both sexes at the State Farm School.

Mr. F. G. Gould of Excelsior, offered the following resolutions on the horticultural exhibit at the World's Fair, which were unanimously adopted, viz:

To the Directors of the World's Columbian Exposition.

At a meeting of the Minnesota State Horticultural Society, held at St. Anthony Park, July 10, 1891, the following preamble and resolutions were unanimously adopted:

"WHEREAS, In opposition to the urgent requests of the combined horticultural interests of the country for a representative man as chief of that department one has been named and awaits confirmation who in no sense represents American horticulture; and

"WHEREAS, The present classification of this department has been indorsed by the National Commission, and with the support of a partisan chief is likely to remain unchanged; and

"WHEREAS, This classification, giving eight separate classes for wines and brandies alone, with but four to horticulture proper, outrages the better sentiment of the American people, and is unjust and unsatisfactory to the horticulturists of the entire country; be it

"*Resolved*, That in the event of the confirmation of William Forsyth, or any other non-representative man, and especially one pledged to the above unjust classification, we are without hope of making in the main building a representative exhibit of American horticulture, and we will use our influence in every possible manner to confine those exhibits to our state building, and will invite our sister states to do likewise, as we cannot and will not destroy the prospects for an enthusiastic exhibition of fruits, flowers and plants, with their grand seasonable shows, by indorsing a man and a classification which connects horticulture with and makes it subordinate to displays of wine and brandy."

The secretary was instructed to send a copy of these resolutions to the directors of the World's Fair.

Dr. M. M. Frisselle, of Excelsior, read a report on the "Fruit Prospects at Lake Minnetonka." (*See index.*)

A report on fruits, from Dewain Cook, of Windom, was read by the secretary. (*See index.*)

C. L. Smith, of Minneapolis, then read a paper entitled "Small Fruit Interests." (*See index.*)

Prof. C. D. Smith, the new Director of the State Farm, was introduced to the meeting, and spoke pleasantly of the State of Minnesota and of his work, especially dwelling upon his interest in the work of the Horticultural Society, and of its importance to the public. He expressed a strong interest in the movement to furnish accommodation in the school for the young ladies of the state.

The following resolution was unanimously adopted:

Resolved, That this society recommend to the Regents of the State University the importance of establishing an additional department in the Agricultural School for the education of the farm girls of our state on an equal basis with the boys.

J. M. Underwood, of Lake City, offered the following:

Resolved, That this society heartily recommend the appointment of J. S. Harris to the position of special agent of the Division of Pomology for the Department of Agriculture.

This was adopted, and the secretary was requested to transmit a copy to the proper U. S. official.

The matter of library location was discussed and referred for decision to the library committee.

The thanks of the society were unanimously extended to Professors C. D. Smith and S. B. Green for the hearty hospitality tendered to the society in the entertainment of the day.

The summer meeting then adjourned *sine die*.

A. W. LATHAM, Secretary.

LIST OF PREMIUMS AWARDED AT THE SUMMER MEETING.

FLOWERS.

Miss Mattie Lyons, Minneapolis—		
Hand bouquet	Second,	$1.00
Collection of cut flowers	Second,	3.00
R. S. Mackintosh, Langdon—		
Collection of cut pansies	Second,	2.00
E. Nagel & Co., Minneapolis—		
Hand bouquet	First,	2.00
Floral design	First,	5.00
Collection of cut flowers	First,	5.00
Collection of cut carnations	First,	3.00
Collection of cut roses	Second,	2.00

F. G. Gould, Excelsior—		
Collection of cut carnations	Second,	$2.00
Miss Ida C. Sewall, St. Anthony Park—		
Collection of cut roses	First,	3.00
J. G. Bass, Hamline—		
Collection of cut pinks	Special,	1.00
Collection of cut pansies	First,	3.00

SMALL FRUITS, &C.

Raspberries.

Wm. Lyons, Minneapolis—		
Collection	First,	$3.00
Cuthburt	First,	1.00
Schaeffer	First,	1.00
Philadelphia	First,	1.00
Carolina	First,	1.00
J. M. Underwood, Lake City—		
Cuthburt	Second,	.50
Schaeffer	Second,	.50
Gregg	Second,	.50
Doolittle	First,	1.00
Clark	First,	1.00
J. G. Bass, Hamline—		
Turner	First,	1.00
N. J. Stubbs, Markville—		
Gregg	First,	1.00
Marlboro	First,	1.00
D. V. Plants, Long Lake—		
Best quart		2.00
Souhegan	First,	1.00
Hilburn	First,	1.00
M. M. Frisselle, Excelsior—		
Second-best quart		1 00
R. P. Lupton, Excelsior—		
Collection	Second,	2.00

Currants.

N. J. Stubbs, Markville—		
White Grape	First,	1.00
White Dutch	First,	1.00
Stewart's Seedling	First,	1.00
Victoria	First,	1.00
J. F. Gilmore, Richfield—		
Collection	First,	3.00
M. M. Frisselle, Excelsior—		
Cherry	First,	1.00
Stewart's Seedling	Second,	50
Red Dutch	Second,	50
J. M. Underwood, Lake City—		
Collection	Second,	2.00
J. G. Bass, Hamline—		
White Grape	Second,	50
Red Dutch	First,	1.00

Gooseberries.

C. L. Smith, Minneapolis—		
Houghton	First,	$1.00
J. F. Gilmore, Richfield—		
Collection	First,	3.00
J. M. Underwood, Lake City—		
Houghton	Second,	50

Strawberries.

C. W. Gordon, Long Lake—		
Wilson	First,	$1.00
Crescent	First,	1.00

Cherries.

C. W. Gordon, Long Lake—		
Variety unknown	First,	$1.00

VEGETABLES.

Wm. Lyons, Minneapolis—		
Pie-plant	First,	$1.00
Asparagus	First,	1.00
J. G. Bass, Hamline—		
String beans	First,	1.00
Onions	Second,	50
Lettuce	First,	1.00
G. Chandler, Minneapolis—		
Hubbard Squash	First	1.00
Cabbage	First,	1.00
R. P. Lupton, Excelsior—		
Asparagus	Second,	50
Beets	First,	1.00
Carrots	First,	1.00
Onions	First,	1.00
Radishes	First,	1.00
Turnips	First,	1.00
Pie-plant	Second,	50
Lettuce	Second,	50
Cabbage	Second,	50
Cauliflower	First,	1.00
Green peas	First,	1.00
String beans	Second	50
New potatoes	First	1.00
J. R. Cummings, Eden Prairie—		
New potatoes	Second,	50

ANNUAL WINTER MEETING.

PROGRAM OF THE TWENTY-FIFTH ANNUAL MEETING OF THE MINNESOTA STATE HORTICULTURAL SOCIETY.

TO BE HELD IN OWATONNA, MINN., TUESDAY, WEDNESDAY, THURSDAY AND FRIDAY, JANUARY 19, 20, 21, AND 22, 1892.

By invitation this, the quarto-centennial meeting of our society, is to be held in the city of Owatonna.

Located at the crossing of the C. & N. W. R'y, running east and west, and the C. M. & St. P. R'y, running north and south, and about 70 miles south of Minneapolis, this place is very accessible for such a gathering.

The citizens of Owatonna extend to our society their hospitality and all delegates and members in attendance will be entertained by them free of expense.

As the societv has increased in membership during the past year over 50 per cent. and the interest in horticulture both as a pursuit and a recreation is rapidly increasing, a meeting of unusual profit may be expected.

The twenty-fifth annual gathering, marking the close of a quarter century since the organization of the society, makes it an anniversary, a point at which to pause and, reviewing our achievements and failures take new courage for the work. It is hoped that at this meeting the members will be present in full force and especially those who, now in the decline of life, having borne the heat and burden of the day, have the more right to celebrate this re-union, assist in the review, and lend a hand in dedicating the society anew to its career of usefulness.

The usual reduction to one and one-third rate for the round trip has been made by most of the railroads in the state. To avail themselves of this reduction, persons must call for a ticket to the horticultural meeting at Owatonna at the depot of departure and obtain a certificate thereof, and this must be done at all depots of connecting lines where tickets must be bought. These certificates, when signed by the secretary of the society

upon presentation to the ticket agents, will secure tickets for a return at one-third rates.

Premiums are offered for fruit, flowers and vegetables. and attendants are requested to bring specimens for exhibition and especially *new* fruits or flowers.

Prof. O. Lugger, the entomologist of the State Experimental Farm, will read a practical paper, and at that time opportunity will be given for discussing means of suppression of insects, etc.

Discussion will follow the reading of each paper and all means will be used to make the exercises interesting and valuable to all concerned.

A question box will be provided to be opened at the beginning of each session and all are requested to avail themselves of this means of obtaining information.

The time of the session has been divided among the different branches of horticulture and as far as practicable the papers and discussions of each branch will be confined to the session allotted to it, so that persons specially interested in any subject may plan to be in attendance at that time. The classification will appear in the program.

Bountiful harvests and fair prices for agricultural products put it within the means of any one interested in horticulture (who is not?) to attend this meeting. The only expense is the reduced railroad fare and one dollar annual membership fee, which entitles to a bound copy of the transactions.

Come and bring along your wife and enjoy the good things in store for you here. *All* are invited.

Friend Dartt says "bring on your hosts," but not to overwhelm such kindness, every one who intends to avail himself of this hospitality should notify E. H. S. Dartt, of Owatonna, not less than one week prior to the meeting.

Papers publishing this program or calling attention to the meeting and sending a marked copy to the secretary, will receive free by mail a bound copy of the transactions when published.

WYMAN ELLIOT, President,
Minneapolis.

A. W. LATHAM, Secretary,
Excelsior, Minn.

PROGRAM.

TUESDAY, JANUARY 19.

Morning Session, 10 o'clock.

Prayer, by Rev. W. R. Weaver, Owatonna.

General subject Forestry, including *Evergreens, &c.*

Report of committee on forestry. { J. O. Barrett, Browns Valley. M. Cutler, Sumter. C. L. Smith, Minneapolis.

Report of committee on evergreens. { C. F. Miller, Faribault. Wm. Somerville, Viola. G. W. Fuller, Litchfield.

Foresting the Great Plains.—B. E. Fernow, Washington, D. C.

Influence of the Rocky Mountains on Food Plants.—E. D. Ensign, Hot Springs, Col.

Forestry the Remedy for our Climatic Ills.—Prof. Chas. A. Keffer, Brookings, S. D.

The Proposed National Park in Northern Minnesota.—J. O. Barrett, Browns Valley.

Some Notes on the Trees, Shrubs and Flowering Plants of the Upper Minnesota Valley. Lycurgus R. Moyer, Montevideo.

Afternoon Session, 2 o'clock.

Question box.

General subject, Apples and Plums.

Report of committee on Russian apples. { Wm. Somerville, Viola. A. Peterson, Waconia. J. S. Harris, La Crescent.

The Hibernal and Lieby.—Clarence Wedge, Albert Lea.

Russian Apples.—A. Peterson, Waconia.

Orcharding.—Wm. Somerville, Viola.

Drawbacks to Apple Growing.—J. G. Brown, Perry, Ia.

Orcharding in Southern Minnesota.—R. C. Keel. Rochester, Minn.

Report of committee on seeding fruits.—J. S. Harris, La Crescent.

Report of committee on native fruits { Dr. J. R. Walker, St. Anthony Pk. J. S. Harris, La Crescent. Prof. C. B. Waldron, Fargo, N.D.

Report of committee on general fruits.—

F. H. Fiedler, Fergus Falls.	S. H. Kenney, Morristown.
L. E. Somerville, Viola.	Sidney Corp, Hammond.
C. F. Miller, Faribault.	L. R. Moyer, Montevideo.
D. K. Michenor, Etna.	Clarence Wedge, Albert Lea.
M. Pearce, Chowen.	J. C. Kramer, La Crescent.
R. C. Keel, Rochester.	H. J. Ludlow, Worthington.

Condition of Fruit Growing in Central Minnesota.—G. W. Holmes, Glencoe.

Beyond the Forty-ninth Parallel.—Thos. Frankland, Stonewall, Man.

Successful Fruit Growing in Western Minnesota.—W. J. Wickersheim, Idlewild.

Evening Session, 7 o'clock.

Music.
Address of Welcome.—Hon. L. L. Wheelock, Owatonna.
Response to Address of Welcome.—J. M. Underwood, Lake City.
President's Address.—Wyman Elliot Minneapolis.
Music.
Annual report of secretary.
Annual report of treasurer.
Annual report of librarian.
Reports of vice presidents.
Reports of local societies.
Appointments of committees on fruit list, award of premiums, final resolutions, obituary, &c.

WEDNESDAY, JANUARY 20.

Morning Session, 9 o'clock.

Prayer by Rev. R. N. Avison, Owatonna.
Question box.
General subjects, Small Fruits and Grapes.
Report of committee on small fruits. { M. Pearce, Chowen. / M. Cutler, Sumter, / Dewain Cook, Windom.
Small Fruits in Southwestern Minnesota.—Dewain Cook, Windom.
Blackberries in the Big Woods.—S. Cutler, Excelsior.
A Woman's Experience with Small Fruits.—Mrs. Anna B. Underwood, Lake City.
Strawberry Culture.—John Little, Granton, Ont.
Raspberry Farming.—P. H. Perry, Excelsior.
Business Management in Small Fruits.—M. A. Thayer, Sparta, Wis.
Report of committee on grapes. { M. M. Frisselle, Excelsior. / J. S. Featherstone, Nininger. / J. S. Sewall, St. Anthony Park.
Grape Growing in Minnesota.—M. M. Frisselle, Excelsior.
An Amateur's Success with Grapes.—Samuel Doughty, Lake City.
Grapes.—Daniel Buck, Mankato.
Report of committee on grape insects and diseases.— { J. S. Harris, La Crescent. / A. W. Latham, Excelsior. / J. Norquist, Red Wing.

Afternoon Session, 2 o'clock.

Question box.
General subjects, Floriculture, Landscape Gardening, &c.
Report of committee on house and greenhouse flowering plants— { A. S. Swenson, St. Paul. / F. G. Gould, Excelsior. / E. Nagel, Minneapolis.
In What Way can the Florists and the Horticultural Society be Mutually Beneficial?—A. S. Swenson, St. Paul.
Our Native Shrubs.—Miss Sara M. Manning, Lake City.
Report of com. on native flowers. { Miss Sara M. Manning, Lake City. / Prof. C. McMillan, St. Anthony Park. / Mrs. Jennie Stager, Sauk Rapids.

Report of committee on out-door flowering plants.—
Gust. Malmquist, Minneapolis.
Mrs. A. B. Underwood, Lake City.
Miss Ida C. Sewall, St. Anthony Park.

Report of committee on ornamental deciduous trees and shrubs.—
Samuel B. Green, St. Anthony Park.
Wayland Steadman, Rochester.

Hardy Shrubs.—J. M. Underwood, Lake City.

Parks for Small Towns.—Prof. H. W. S. Cleveland, Minneapolis.

The Planting and Care of Ornamental Trees and Shrubs.—W. M. Berry, Superintendent of Parks, Minneapolis.

Some New Things of Value.—Prof. S. B. Green, St. Anthony Park.

Report of committee on new flowering plants.—
M. C. Allison, Minneapolis.
E. A. Venzkee, St. Paul.
C. A. Smith, Minneapolis.

Red Spider in the Greenhouses.—F. G. Gould, Excelsior.

Progress of the Florist Business in the Last Decade.—A. S. Swenson, St. Paul.

Evening Session, 7:30 o'clock.

To be held at the Pillsbury Academy. An interesting program has been arranged by the management, consisting of music, recitations and addresses. Amongst those who will take part are Dr. J. W. Ford, Principal of the Academy; W. Elliot, President of the Horticultural Society, and Hon. Geo. A. Pillsbury, of Minneapolis.

THURSDAY, JAN. 21.

Morning Session, 9 o'clock.

This session will be under the management of the Minnesota Beekeepers' Association. For order of exercises see their program, printed herewith.

Afternoon Session, 2 o'clock.

Question box.

Report of committee on award of premiums.

Beport of committee on president's address.

Report of delegate to American Pomological Society.

Report of delegates to Wisconsin and South Dakota Horticultural Societies.

Report of executive committee.

Election of officers.

The Horticultural Exhibit from Minnesota at the World's Fair.—A. W. Latham, Secretary.

Discussion.

Reports from experiment stations:

Prof. S. B. Green, Supt. of central station, State Experimental Farm St. Anthony Park.

Superintendents of sub-stations:

E. H. S. Dartt, Owatonna. O. M. Lord (plums and small fruits), Minnesota City.

F. H. Fiedler, Fergus Falls.

B. F. Jenness, Willmar. C. W. H. Heideman (plums and small fruits), New Ulm.

Dewain Cook, Windom. D. E. Myers, St. Cloud.

Clarence Wedge, Albert Lea. H. M. Lyman (apples), Excelsior.

Chas. W. Sampson (grapes), Excelsior.

Evening Session, 7:30 o'clock.

Music.

Horticulture in the Farmers Institutes.—O. C. Gregg, Supt. of Farmers Institutes, Minneapolis.

Lights and Shadows of Horticulture.—M. Cutler, Sumter.

Twenty-five Years in the Minnesota State Horticultural Society.—Col. J. H. Stevens, Minneapolis.

Communication and poem, from J. T. Grimes, Minneapolis.

Reminiscences.—Ex-President A. W. McKinstry, Faribault.

Five minute talks by old members.

Music.

Review of Horticulture in Minnesota.—J. S. Harris, La Crescent.

The Future of Horticulture in Minnesota.—S. B. Green, St. Anthony Park.

Music.

FRIDAY, JAN. 22.

Morning Session, 9 o'clock.

Prayer by Rev. J. A. Chamberlain, Owatonna.

Question box.

General subject, Vegetable Garden and Pantry Stores.

Report of committee on vegetable gardening. { Joshua Allyn, Red Wing. G. Chandler, Minneapolis. R. P. Lupton, Excelsior.

Culture of Asparagus.—Joshua Allyn, Red Wing.

Onion Culture.—R. P. Lupton, Excelsior.

Outlook of the Sugar Beet Industry.—Prof. W. M. Hays, St. Anthony Park.

Celery Growing in Marsh Land.—J. A. Sampson, Excelsior.

Drainage in Minnesota.—Prof. W. M. Hays, St. Anthony Park.

Report of committee on pickles, preserves and canned goods.—

{ Mrs. S. B. Green, St. Anthony Park. Miss Mary Grimes, Minneapolis. Mrs. A. Bonniwell, Hutchinson.

Canned Fruits and Pickles.—Mrs. A. Bonniwell, Hutchinson.

Report of committe on bread and cake.—

{ Mrs. O. C. Gregg, Minneapolis. Mrs. Clara S. Hays, St. Anthony Park. Mrs. G. W. Shuman, Minneapolis.

The Cooking of Fruits.—Mrs. Clara S. Hays, St. Anthony Park.

Afternoon Session, 2 o'clock.

Question box.

General subject Entomology and Ornithology.

Report of committee on entomology. { Prof. Otto Lugger, St. Anthony Pk. R. J. Mendenhall, Minneapolis. J. S. Harris, La Crescent.

The Injurious Insects of the Season.—Prof. Otto Lugger, St. Anthony Park.

Report of committee on ornithology. { F. J. Harris, La Crescent. / Otto L. Bullis, Winnebago City. / B. L. Wilcox, Hastings.

Report of committee on the fruit list.

Report of committees on obituaries, final resolutions, &c.

Closing exercises.

Adjournment.

PREMIUM LIST.

Exhibitors competing must be or become members of this society, and growers or makers of the articles exhibited. The fruits, flowers and vegetables exhibited must have been grown in Minnesota. All exhibits must be in place by 2 p. m. of the first day of the meeting. Each exhibit of fruit or vegetables must consist of five specimens.

APPLES.

	1st Prem.	2d Prem.
Collection (including crabs).....3d prem. $3.00	$8.00	$5.00
Wealthy	2.00	1.00
Winter apple—any variety	2.00	1.00
Collection of Russian apples	3.00	2.00
Russian winter apple—any variety	2.00	1.00
Seedling apple never before exhibited	5.00	3.00
Seedling crab never before exhibited	3.00	2.00

GRAPES.

Collection	5.00	3.00
Plate of any variety	3.00	2.00

CRANBERRIES.

Collection	3.00	2.00

PLANTS IN POTS.

The citizens of Owatonna are invited to bring out their flowers.

Collection of ornamental and flowering plants	5.00	3.00
Rose in bloom	2.00	1.00
Geranium in bloom	2.00	1.00
Any single plant in bloom	2.00	1.00
Begonia	2.00	1.00
Begonia Rex	2.00	1.00
Carnation	2.00	1.00
Cactus	2.00	1.00

CUT FLOWERS.

Floral design	5.00	3.00
Collection of roses	3.00	2.00
Collection of carnations	3.00	2.00
Table bouquet	3.00	2.00
Basket of flowers	3.00	2.00

VEGETABLES.

Collection—not less than ten kinds	$5.00	$3.00
Early potatoes	1.00	.50
Late potatoes	1.00	.50
Onions	1.00	.50
Turnips	1.00	.50
Beets	1.00	.50
Parsnips	1.00	.50
Carrots	1.00	.50
Hubbard squash—one specimen	1.00	.50
Celery	1.00	.50
Cabbage—one specimen	1.00	.50
Cauliflower—one specimen	1.00	.50

PANTRY STORES, PRODUCT OF 1891.

Collection of canned fruits	3.00	2.00
Collection of jellies	2.00	1.00
Collection of pickles	2.00	1.00
Vinegar	2.00	1.00
Maple syrup	2.00	1.00
Maple sugar	2.00	1.00
Comb honey	5.00	3.00
Extracted honey	3.00	2.00

A special premium of twenty-five dollars is offered for the best display, if satisfactory, of fruits and vegetables canned by a process that preserves in a clear liquid the shape and natural color of the article, accompanied by a full description of the process used.

AWARD OF PREMIUMS AT THE WINTER MEETING OF 1892.

APPLES.

R. C. Keel, collection of apples, 1st premium	$8.00
Wm. Somerville, collection of apples, 2nd premium	5.00
R. C. Keel, Wealthy, 1st premium	3.00
Clarence Wedge, Wealthy, 2nd premium	1.00
R. C. Keel, winter apple, (Melinda), 1st premium	2.00
Wm. Somerville, winter apple, (Red Queen), 2nd premium	1.00
R. C. Keel, collection Russian apples, 1st premium	3.00
R. C. Keel, Russian winter apple, (Repka), 1st premium	2.00
R. C. Keel, seedling apple, described as follows, 1st premium	5.00

A sprout from the root of a Wealthy that had died. Tree, five to six feet high; first crop, 15 apples; shape, conical; size, small to medium; color, yellow and green; ground, russet; stem, slender; in deep cavity; calyx, half open, in narrow and shallow corrugated basin; flesh, firm grain; core, medium; flavor, sub-acid; quality, good; season, January to March.

GRAPES.

M. M. Frisselle, collection of grapes, 1st premium	$5.00
H. L. Crane, Duchess, 1st premium	3.00
M. M. Frisselle, Iona, 2nd premium	2.00

FLOWERS.

Mrs. H. M. Goodell, collection of plants, 1st premium	$5.00
D. H. Roberts, collection of plants, 2nd premium	3.00
Mrs. J. H. McRastie, collection of plants, 3rd premium	2.00
Mrs. H. M. Goodell, geranium in bloom, 1st premium	2.00
E. Nagel & Co., single plant in bloom, 1st premium	2.00
Mrs. Charles Jefts, begonia in bloom, 1st premium	2.00
J. W. Ford, carnation in bloom, 1st premium	2.00
Mrs. H. M. Goodell, cactus in bloom, 1st premium	2.00
Mrs. Charles Jefts, cactus in bloom, 2nd premium	1.00
E. Nagel & Co., floral design, 1st premium	5.00
F. G. Gould, collection cut roses, 1st premium	3.00
F. G. Gould, collection cut carnations, 1st premium	3.00
E. Nagel & Co., table bouquet, 1st premium	3.00
F. G. Gould, table bouquet, 2nd premium	2.00

VEGETABLES.

W. L. Parker, early potatoes, Beauty of Hebron, 1st premium	1.00
W. L. Parker, late potatoes, Rural New Yorker, 1st premium	1.00
E. Ware, turnips, 1st premium	1.00
J. A. Sampson, turnips, 2nd premium	.50
E. Ware, beets, 1st premium	1.00
J. A. Sampson, carrots, 1st premium	1.00
E. M. Chandler, Hubbard squash, 1st premium	1.00
J. A. Sampson, celery, 1st premium	1.00

PANTRY STORES.

Mrs. C. A. Smith, collection canned fruit, 1st premium	3.00
Mrs. A. Bryson, collection canned fruit, 2nd premium	2.00
Mrs. J. H. McRastie, collection canned fruit, 3d premium	1.00
Mrs. A. Bonniwell; collection of jellies, 1st premium	2.00
Mrs. J. H. McRastie, collection of jellies, 2nd premium	1.00
Mrs. A. Bonniwell, collection of pickles, 1st premium	2.00
W. L. Parker, maple syrup, 1st premium	2.00
Mrs. J. H. McRastie, maple syrup, 2nd premium	1.00
W. L. Parker, maple sugar, 1st premium	2.00
M. Cutler, comb honey, 1st premium	5.00
C. C. Aldrich, comb honey, 2nd premium	3.00
J. W. Murray, extracted honey, 1st premium	3.00
Mrs. A. A. Kennedy, sorghum syrup, 1st premium	2.00

RECORD OF THE TWENTY-FIFTH ANNUAL MEETING

OF THE

Minnesota State Horticultural Society,

HELD AT OWATONNA, MINNESOTA, TUESDAY, WEDNESDAY, THURSDAY AND FRIDAY, JANUARY 19, 20, 21 AND 22d, 1892.

FIRST DAY.

MORNING SESSION, TUESDAY, JANUARY 19.

Promptly at 10 o'clock the meeting was called to order by the First Vice-President, Clarence Wedge, of Albert Lea, Minnesota.

Vice-President Wedge: We have met under rather adverse circumstances this morning, being denied the valued services of our esteemed president, Mr. Elliot; and also by reason of the inability of the Rev. W. R. Weaver to be present with us and open our meeting with prayer, according to our usual custom. So we shall have to do the best we can under the circumstances and proceed to a consideration of the subjects contained on our programme. The first subject is that of forestry. We would be glad to hear from Mr. J. O. Barrett, the chairman of the committee on forestry.

Mr. J. O. Barrett: Mr. Chairman, before reading the paper to which I shall call your attention, I wish to explain that I wrote to Mr. E. D. Ensign for the paper which he promised, but as he met with an accident and was therefore unable to write it, he appealed to his friend Mr. Edward L. Berthoud, an engineer, of Golden, Col.—a very scholarly man.

The following paper was then read by Mr. J. O. Barrett: "Climatic Influence of the Rocky Mountains upon the Agricultural Products of Minnesota and Dakota," by Edward L. Berthoud, Golden, Colorado. (*See index.*)

Mr. Barrett: I also have here a paper by Mr. Eggleston, which I will now read.

The following paper was then read by Mr. Barrett: "Forestry and Arbor Day," by N. H. Eggleston. (*See index*).

Mr Barrett: I will also read the following communication from Mr. H. D. Ayres. Mr. Barrett here read a paper entitled "The Forest Reserve of Minnesota," by H. B. Ayres. (*See index.*)

After a short discussion Mr. Barrett read the following paper "The Proposed National Park in Northern Minnesota," by J. O. Barrett, Browns Valley. (*See index*).

A committee consisting of J. S. Harris, H. J. Ludlow, J. M. Underwood, L. H. Wilcox and J. O. Barrett were appointed a committee to prepare resolutions on the subject of this paper.

An interesting discussion followed.

The following paper was then read by the author: "Some Notes on the Trees, Shrubs and Flowering Plants of the Upper Minnesota Valley," by Lycurgus R. Moyer, Montevideo, Minnesota. *(See index.)*

A long discussion ensued.

Vice-President Wedge: As our time has arrived to adjourn, we will be obliged to close the discussion on this subject. We will now adjourn to meet at 2 o'clock this afternoon,

Mr. Barrett: When at Washington, I pledged myself, with other gentlemen, to raise a sum of money for the Forestry Association. The delegates from New York said we will do so and so, and my state pride was aroused, and I said I will do better than New York. I pledged myself to raise fifteen mem bers from Minnesota. The fee is $2.00 each. I must carry out that pledge, and I ask you gentlemen to become members.

The meeting was here adjourned until 2 P. M.

AFTERNOON SESSION, TUESDAY, JANUARY 19.

The meeting was called to order at 2 P. M. by Vice-President Wedge.

Vice-President Wedge: The first thing on the program this afternoon is a report of the committee on Russian apples. I understand we have a report here from Mr. Andrew Peterson, which will be read by the secretary.

Secretary Latham: I have a report here from Mr. Andrew Peterson of Waconia. He consented to write a paper on

"Russian Apples," and in this report, he embodies that paper and also his report on the Experimental Station work. I will read it at this time.

The paper was then read by the secretary. (*See index.*)

Vice-President Wedge: Perhaps it would be well, before discussing this paper, to listen to Mr. Harris' report on the same subject.

The following was then read by the author: "Report of committee on Russian apples," by J. S. Harris, La Crescent, Minnesota. (*See index*). These two papers were then discussed briefly.

Vice-President Wedge: If there is no further discussion on this point I will read a paper which I have prepared for this meeting.

Mr. Wedge then read the following paper: "The Hibernal and Lieby," by Clarence Wedge, Albert Lea. (*See index*).

The secretary then read the following paper: "Orcharding," by William Somerville, Viola. (*See index.*)

Vice-President Wedge: The next paper is written by a man who grows thousands of bushels of apples, and who is one of the largest, if not the largest grower in the state.

Mr. R. C. Keel then read the following paper: "Orcharding in Southern Minnesota," by R. C. Keel, Rochester. (*See index.*) A short discussion ensued.

Vice-President Wedge: We will now listen to the report of J. S. Harris on seedling fruits.

Mr. Harris then read his report of committee on seedling fruits. (*See index.*) On motion of Mr. Brand the report was accepted and the recommendations contained in it were adopted.

The report of committee on native fruits was next read by Mr. J. S. Harris. (*See index.*)

Vice-President Wedge: The next thing on the program is the report of the committee on general fruits.

Mr. S. H. Kinney, of Morristown, Minnesota, then read his report as a member of the committee on general fruits. (*See index.*) The reading was followed by a discussion.

Mr. Keel here read "A report on general fruits," by R. C. Keel, Rochester, Minnesota. (*See index.*) This was also discussed.

Vice-President Wedge: The next thing on our program is the report by Judge L. R. Moyer, of Montevideo, Minnesota. (*See index.*)

Vice-President Wedge: We will next hear the report of Mr. H. J. Ludlow of Worthington. (*See index.*)

Vice-President Wedge: We have just received the following interesting telegram from our president, who is on his way home from California:

WOODLAND PARK, Col., January 19, 1892.

A. W. Latham, Secretary Minnesota State Horticultural Society.

Very regretful I am prevented meeting the friends of horticulture. Pass strong resolutions endorsing the forest reserve system. Expect to be at my office Saturday. WYMAN ELLIOT.

The telegram was received with applause by the members.

The secretary then read the following reports: "Report on General Fruits." (*See index*), and "A Report on Experimental Stations," both by M. Pearce, Chowen. (*See index.*)

These reports were listened to with attention.

The secretary then read the following paper: "The Condition of Fruit Growing in Central Minnesota," by G. W. Holmes, Glencoe, Minn. (*See index.*)

The secretary next read the following paper: "Beyond the 49th Parallel," by Thomas Frankland, Stonewall, Manitoba. (*See index.*)

The secretary then read the following: "A Report on General Fruits," by C. F. Miller, Faribault, Minn. (*See index.*)

Secretary Latham: I want to say before we adjourn that I have prepared a register of membership of the society, and I wish members would examine it and see if it is correct as far as their names are concerned, and also the names of others of whom they know. Of course such a register will not be entirely correct, for mistakes will creep in, in both names and post office addresses. It is my desire however, to have it as correct as possible and I ask the assistance of the members present, in perfecting it.

I want also to call the attention of the members to the beautiful display of fruit on this table. These oranges were sent to the society with express on them pre-paid, by our old friend and fellow member, Truman M. Smith, of San Diego, Cal., who was for so many years, president of this society. He has also written a letter which will be read tomorrow evening to the society.

The secretary then occupied a few minutes in exhibiting and describing the fruit donated by Mr. Smith.

Vice-President Wedge: If there is no objection we will now adjourn until 7:30 this evening.

The meeting was here adjourned.

EVENING SESSION, TUESDAY, JANUARY 19.

The evening was called to order at 7:30 P. M., by Vice President Wedge.

Vice-President Wedge: The first thing we have on hand this evening is the address of welcome by the Hon. L. L. Wheelock.

ADDRESS OF WELCOME.

BY HON. L. L. WHEELOCK, OWATONNA.

Ladies and Gentlemen of the Minnesota State Horticultural Society:

We are glad that you have come here and we hope that you are, and trust that you will be happy when you go away because you have been so well treated at our hands. When this pleasant duty of bidding you welcome to our beautiful city was assigned to me, I do not suppose that it was generally known how important a part I played in the organization of this association. In fact, I did not know it myself until I read it from the books. (Laughter.)

A quarter of a century ago last September I came to the State of Minnesota fresh from the orchards of western New York. When I arrived in Minnesota there was no such thing in existence as the Horticultual Society—no, not even the Fruit Growers Association. But on October 4th, 1866, before I had been in the state six weeks, this society was organized, and that, too, I presume, without any knowledge on the part of these pioneers, such as Col. Robertson, Mr. Harris, and Col. Stevens and others, that I had arrived. (Laughter.) So you see how our silent influence goes up and out and around.

If I were to state how I became the god-father of the Bee-Keepers Association I fear that I should *be(e)keeping* you here to long, and so merit a *stingin'* rebuke, so I won't say anything about it. (Laughter.) But, seriously, my dear friends, we are glad to have you among us because you have done so much for us; because you have done so much to make our homes and their environments pleasant and beautiful; homes that are calculated to make good neighbors and reliable citizens. Twenty-five years ago, as we remember—those of us who have been here so long and longer—when we looked out upon these prairies we saw the cabins and dugouts in their desolation without a shrub even to protect them. At least this was the general rule. Perhaps some settler more fortunate than the others had located his cabin in a grove of scrub oaks or poplars, and possibly some few early settlers were cultivating with a good deal of difficulty a grove of Lombardy poplars. I need not say to you what time has wrought, or what we now have about our dwellings—trees and flowering shrubs in almost all varieties, flowers and small fruits in abundance. We have not made that progress that we are going to, and that we would have liked to, in raising apples and pears, plums and cherries, and such other fruits; but we are more of a fruit growing state than many of us believe. In 1885, at the great Cotton Centennial at New Orleans, I was particularly interested in the fruit display. I was looking out for some country where I could locate, in which I could get plenty of delicious

fruit. I went to that part of the building that was assigned to Oregon, the land of the big apple, and to other states to view their displays. Well, I found on the table some withered specimens that looked very forlorn. I went around to Minnesota and fonnd there upon the table the most beautiful fruit I had ever seen. It was fruit that was admired by every one who saw it. Now, it was stated to me by some one from Oregon or elsewhere, that their fruit had been on the table all winter and that Minnesota fruit was kept in cold storage and brought on fresh as it was needed. However, that may not give us any trouble because we have as much cold storage in Minnesota as we have apples. (Laughter and applause.)

A year ago last fall an old friend and schoolmate of mine, who is a fruit commission merchant in the city of Philadelphia, wrote me, saying that the fruit crop in western New York, Virginia, Maryland and some other fruit growing sections upon which he had been accustomed to rely, had been a failure, but he had seen from the papers that Minnesota had an abundant crop of fruit; and he wished I would put him in correspondence with some of our commission merchants so that he might supply his customers. I did the best I could. (Laughter.) So you see how our fame as a fruit growing country has gone out, and all by reason of what these gentlemen have done. (Applause.)

You have done well. We appreciate that fact, and we are glad you are here with us. We are not going to make you vain by giving you all the credit for what has been done. But I think you are entitled to the biggest share of the glory, and as you have earned it, we will let you have it. We are glad of two things; that you are entitled to the biggest share of the apples, and that you have brought them with you.

We want you should come to our homes while you are here, and make yourselves at home and partake with us of the good cheer which we have, such as the dried apple pie, and other delicacies of the season which you have enabled us to have. Make yourselves perfectly at home, and if you don't see what you want, why ask for it. (Laughter.) Just come right in.

Now, I have been told, and I think on good authority, that this other association has not been "wasting its sweetness on the desert air," but they have been demonstrating to us that the time has come when we should "be(e) keeping" ourselves with greater sweetness, not only of temper but in all other ways.

I understand that one of the secrets of success in your business is the proper selection of a queen for the hive. I may be misinformed, but if this is true, I will tell you, gentlemen, that you could not have come to a better place. You can study their habits while you remain with us, but do not take any away with you. (Laughter and applause.) Just make yourselves at home, and we hope that you will be treated with that courtesy and that consideration which will induce you to come again.

Now there is one thing that I was going to say—I want to say something that may be beneficial to you. As I have traveled on the Pacific coast, and in other arid sections of the country where the subject of irrigation is a great subject, I have had pointed out to me a little plot of ground that raised such a fabulous amount of produce, and I have inquired to ascertain how much fertilization, cultivation and irrigation was required to produce this fabulous amount. And I have wondered if we

could not do that Can't you put us on to something in that line? I would suggest, however, that if you gentlemen are going to experiment in this matter of irrigation while you are here, knowing our friend Dartt, as we all do, I would advise you to confine your experiments exclusively to the city water. (Laughter.)

Now, as I said before, make yourselves at home. If there is any thing that we can do for you we will do it, and if you see us running off just halloo and tell us that you want us. Again, I will say that we are glad that you are here, and we hope you will come again. (Applause.)

RESPONSE TO ADDDESS OF WELCOME.

BY J. M. UNDERWOOD, LAKE CITY.

In behalf of the society I return you our sincere thanks for this cordial welcome. I am very glad of the earnest request on your part that we should make ourselves at home, and that it did not end up as the old lady's did. She had some company come to see her one afternoon—some lady friends, and when they came in she said: "I am delighted to see you, I hope you will make yourselves at home. I am at home, and I wish you were." (Laughter.) We have come here from our several homes, scattered over the state of Minnesota, for the purpose of renewing our acquaintance with one another, and also to report to this association our experience during the past year; to counsel with each other how we may, if possible, avoid any mistakes that we have made in horticulture. When your invitation first came to us "on the wings of a Dartt," we were not very swift to accept it. We were occupying a very pleasant situation on the lap of Miss Minne-Apolis, and as most of us are rather fond of female society we were rather loth to leave that situation; and then, too, your Honorable Representative from Owatonna has always occupied a very conservative position in our society, and has generally been found sitting on our coat tails when we were getting too giddy, and we thought it was an idea of his that we were getting too familiar with Minne. However, we are very glad to be here. I find that we have come to a bright and enterprising city in which the interests of horticulture have seemingly been well cared for as evidenced by your well appointed lawns and parks, covered with a fine growth of shade and ornamental trees. I have learned that Owatonna derives its name from the Indian word "Owatonnah," signifying straight, and I conclude that you are a straight, upright class of people, and that it becomes us as horticulturists to conduct ourselves in a straight and becoming manner. It seems fitting, that to a community of this character, the large educational interests located here should be entrusted. On this occasion we pass the 25th mile post of our existence as a society. I am reminded forcibly that many of our earnest and most efficient workers in horticulture have been called to their long rest, and that many others have moved away out of the state. Many of us are growing old with the cares and burdens of life. It is our earnest desire, in meeting here with you, that the citizens of Owatonna and the surrounding communities should feel free to come in and participate in our deliberations and become interested workers in our society. Anticipating a very pleasant and profitable meeting with you I again return you our thanks. (Applause.)

Vice President Wedge: The next thing on the program is the president's address.

Secretary Latham: It has not been received yet, but in all probability will be here to-morrow.

Vice President Wedge: The next thing to be considered is the secretary's report.

The secretary's report was then read by the secretary, A. W. Latham.

SECRETARY'S REPORT.

Mr. President, and fellow members of the Minnesota State Horticultural Society,—

I have the honor to present you with my maiden effort as the editor of a book, viz., the nineteenth annual report of the deliberations of your body. It contains imperfections of which I am and you also by this time are aware, but it is the result of an honest effort to put a large amount of valuable horticultural matter in such shape that the reader may get the most of such kind of material as he is in search of, with the least amount of labor. An innovation which it presents is a grouping under general topics of the papers and discussions so that, as nearly as possible, all the matter relating to any topic is to be found in one place. thus doing away with the necessity of examining an entire volume in search of scattered references to one subject.

The report has been reduced in size somewhat by printing the discussions and general deliberations only in long primer, and putting the essays and papers which make up a large part of the book in brevier. This curtailment was the result of an arrangement with the officer in charge of the public printing by which the saving to the state, on account of the decrease in size, was expended in binding in cloth an extra thousand copies. Of the issues of 1891 only 1,500 were paper covered, the remaining 2,000 being cloth bound, some in blue or brown, but mostly in black.

As to the character of the material contained in the report, it compares well with that of previous numbers, and ranks fairly with reports sent out by sister societies. Of the 3,500 copies printed, the 1,500 with paper covers were early placed in the hands of members of the society and others willing to be responsible for their distribution.

As far as can be learned, these have all been put to good use. About three-fourths of the cloth bound copies have also been distributed to or through our members, old and new, to members of the legislature, and others as required by law. Large numbers of the surplus issues of previous years have also been distributed. The value of these reports to the public, depends largely upon their early distribution among those who will make practical use of them, and this I have earnestly endeavored to accomplish.

QUARTER CENTENNIAL.

This year rounds out the quarter century since the founding of the society. While the progress of horticulture in the state has not been a record of continuous success, this cannot be said of the society itself. From the beginning earnest and intelligent workers have labored together faithfully and cheerfully in building up the interests of the society. Few organizations can boast of so many years of self-denying

work, absolutely without jarring or unpleasantness. Such unanimous effort has laid deep and broad the foundation of the Minnesota State Horticultural Society, upon which, in the years to come, is to be builded a superstructure which will be a suitable monument to the labors of its founders.

The condition of the society is largely representative of the condition or horticulture in the state, and both present at this time, a most satisfactory outlook. Our society numbers for the year 1891, 221 annual members, 33 life members, and 18 honorary members for five years, making a total of 272 members. This number is largely in excess of that of previous years and is a good index of increased interest in horticultural pursuits in Minnesota. The principal source of the prosperity of our society is to be found in the self-sacrificing spirit shown throughout the entire membership. From our honored President Elliott, who has given willingly years of toil, down through the whole line of officers and the entire rank and file of the membership,—all have shown willingness to give of their time and divide with others the results of their labor and experiments. While such a spirit prevails, what can prevent the growth of the society and the spread of its important work?

REGISTER OF MEMBERSHIP.

I have prepared with some labor a register of the membership of the society during each of the twenty-five years of its existence, with the thought that it would be interesting material to publish entire in the next annual report.

The register shows that the total number of different persons who have belonged to our society is 846, of which 797 have been annual, 40 honorary and 48 life members. The total is 39 less than the sum of these three items because of duplication in the annual and honorary lists. The membership of the first year, 1866, as nearly as can be ascertained, was 9. That of the last year, 1891, is 272, and the average membership for each year of the quarter-century is approximately 34. An effort is being made to ascertain who of our membership are now deceased, and a place is provided in the register for such record. The register will also show as far as possible the present post office address of those members still living.

LIBRARY.

The president and secretary, as authorized by the executive committee, rented of Wyman Elliot for the nominal price of $5.00 per month a room adjoining Mr. Elliot's private office on the second floor at No. 427 Nicollet avenue, Minneapolis. The room is well lighted and heated, and is admirably suited for a library. It has been fitted up with the necessary furniture, a large table, chairs and a writing desk, with movable shelves filling one side, upon which have been placed, in order, a quantity of each issue of our annual reports, together with at least one copy of all the exchanges that have come to the society, as well as much other valuable material.

A full list of the books in the library, including the reserve stock at Pillsbury Hall, where the great bulk of our reports are stored, will be given in the report of the librarian.

It is the purpose to use this office as a general head-quarters of the society, especially as an office for the secretary and librarian and possibly

for the superintendent of the horticultural exhibit at the World's Columbian Exposition, in which work the society has a special interest.

At this point, I take the liberty of suggesting that the compensation of our librarian is quite out of proportion to the labor, much of it manual, which devolves upon him. The reception and distribution of reports by express, freight and mail, to which the assistant librarian, Mr. E. A. Cuzner attends, involves much work and he is much underpaid by the $10.00 voted for librarian fees last year.

ADVERTISING.

The experiment has been tried the past year, to a limited extent, f getting the assistance of the press to advertise the work of our society. The effort has been reasonably successful, about one-half of the papers approached having run our notices from one to three months, the only compensation being a cloth bound copy of the last report. A large number of calls for reports, enclosing postage, have come from this source as well as several new memberships. Along the same line was the distribution of printed letter heads and envelopes to the various officers of the society. The expense of this was small and the results satisfactory.

Might it not be a good plan to furnish the members of committees with a limited amount of society stationery as a continual reminder of the importance of the work which is placed upon them?

COMMITTEES.

The various committees to whose charge is given a very important work, much akin to that of the experiment stations, were appointed last year by the executive committee soon after the annual meeting. Immediately after their appointment notices were sent out to the appointees and an effort was made to secure a formal acceptance of the appointments. This was partially successful, only one or two refusing the appointments, although a large number failed to respond.

Doubtless often the members best adapted and most willing to work on these committees are not selected and if some plan could be adopted through which the executive committee might be more fully informed as to the preparation and willingness to perform the various branches of committee work, it would greatly assist the advancement of the object of the society. Perhaps an invitation to the members to suggest the lines along which they prefer to work would bring about the desired result.

EXPERIMENT STATIONS.

A new departure has been taken this year in regard to the experiment stations connected with the society, in the direction of centralizing them for the purpose of connecting their work directly with that of the central experiment station.

The central station is located at the University Farm, under the charge of Prof. S. B. Green, under whose directions also are the ten sub-stations, fairly well scattered over the southern half of the state. An effort will doubtless be made to locate stations farther north to cover all of the settled portions of the state.

Much practical good is expected to result from the systematic efforts now being made in this direction, especially in connection with the work of the various committees who are making reports from what are practically experiment stations.

Full information as to the present condition, probabilities and possibilities of horticulture should be found in the reports of our society.

At this point, I wish to say a good word for the professors of the State Agricultural School. Their work lies largely along the lines occupied by our society and their earnest and hearty co-operation with us is adding much to the interest and value of our meetings and the efficiency of our work.

HORTICULTURE IN THE FARMERS' INSTITUTE.

A good work in horticultural education is being done, as heretofore, in the Farmers' Institute and even more attention is being devoted to this branch of agriculture than in previous years.

These institutes should be the medium of making the agriculturists of the state better acquainted with the horticultural society, its objects and the means used of accomplishing them. A reference to our society by the lecturer on horticulture, as opportunity offers, would do much in this direction.

Mr. O. C. Gregg, the manager, is just publishing a new manual in which an increased amount of space is devoted to horticultural subjects.

Although it was spoken of last year, nothing has yet been done in regard to a fruit manual for general distribution. Gotten up in book form and neatly bound in cloth, such a work would be in great demand and do a vast amount of practical good.

DELEGATES.

J. S. Harris was appointed by the executive committee a delegate to the American Pomological Society held at Washington. His report will appear in the regular order.

There is no record of the appointment of delegates to any horticultural societies. With the sanction of President Elliot, I wrote to Mr. Dewain Cook, of Windom, a gentleman residing in a part of the state near to South Dakota, requesting him to attend, as a delegate from our society, the annual meeting of the horticultural society of that state, to be held at Yankton. He complied at once, although with some inconvenience to himself, and his report will be rendered in the regular order.

After the adjournment of that meeting I received notice of the appointment of Prof. Chas. A. Keffer, secretary of their society, as a delegate to our annual meeting.

It is always a great pleasure to entertain gentlemen who come as visiting delegates, from sister societies, and their presence adds much to the interest and value of our meetings. Likewise our members visiting the societies of neighboring states, return to us with an enthusiasm and a treasury of new thoughts, which more than repay the expenditure required.

Would it not be well to empower the president, if he has not already ex-officio the authority, to appoint delegates to the annual meetings of the societies of Wisconsin, N. Iowa and N. and S. Dakota, where such appointments have been overlooked by the society or executive committee?

STATE FAIR.

The horticultural hall at the state fair, was rearranged the past year, allotting to the fruit display, the centre of the south half of the hall, and placing the vegetable exhibit along the sides. New tables were constructed upon which to exhibit the fruit, intended to show it to better advantage.

The display was an unusually fine one, and the results fairly satisfactory to the management.

A booth, or office, for the use of the Horticultural Society was constructed, opposite the fruit tables, and utilized in connection with the exhibit, somewhat as the spider uses his web; at least we succeeded in catching in this way, during the fair week, 15 new members, besides stirring up numberless others to increased good works.

The exhibit demonstrated the fact that there are plenty of the handsomest kind of apples, plums and grapes in our state, and if the management of the Agricultural Society want a bigger show of fruit, all they have to do is to increase the premium list.

WORLD'S FAIR.

An exhibit of the horticultural products at the World's Fair is one of interest to our society. As I enlarge upon this subject in a separate paper, I will make no further reference to it here.

LEGISLATION.

The work which this society is doing fairly entitles it to a right to ask of the State Legislature a much larger appropriation than is now allowed. It would be difficult to find a use to which an additional $1,000 or $1,500 could be put, and give better returns, than in allowing our society the means of extending its field of operations. As the next legislature convenes some weeks before our next annual meeting, would it not be advisable to appoint a committee who should have this matter especially in their charge?

FINANCIAL REPORT.

I have the honor to submit herewith my financial report for the year.

Receipts.

Membership fees	$155.00
Received from treasurer	88.18
	$243.18

Disbursements.

Postage	$84.76
Stationery, printing, &c	67.85
Express and freight on reports received and sent	59.26
Packing material	8.98
Photo engravings	5.00
Sundries	16.60
Balance due the treasurer	.73
	$243.18

CONCLUSION.

The experience of a year as secretary of your body impresses me with the importance of the work devolving upon that office, and a faithful discharge of the duties and obligations that naturally accumulate about it, will tax, to its full extent, the time and ability of the person occupying it. Such an officer should not be content, to do merely the routine work of the office, but should be seeking in all directions, how to widen and extend the society's field of usefulness.

Bringing into the office some zeal, though little experience for this kind of work, it has been my earnest effort to carry out the spirit that it seems to me should animate the labor of the secretary. If I have been fairly successful it is due in large measure to the kindly criticisms and assistance of my fellow officers and members, who have ever shown a hearty sympathy in my work. It is a pleasure to serve those who appreciate your efforts, cheer your successes, and kindly overlook your errors.

A work arousing so profound an interest, as does the work of our society, within its membership and in the general public, with such unanimity of effort on the part of all concerned, furnishes assurance of a grand future for our organization and for that interest for which it exists, the horticulture of the state of Minnesota.

Respectfully submitted, A. W. LATHAM,
Excelsior, Minn., Jan. 19, 1892. Secretary.

On motion of Mr. Harris it was referred to a committee to consider the recommendations contained in it, and report at a future session.

Vice-President Wedge: I will appoint on that committee J. M. Underwood, M. M. Frisselle and Judge L. R. Moyer. The next thing will be the report of the treasurer.

The report of the treasurer, Ditus Day, was here read by himself and accepted by the society.

ANNUAL REPORT OF DITUS DAY, TREASURER OF MINNESOTA HORTICULTURAL SOCIETY, FOR 1891-2.

1891.	RECEIPTS.	
Jan. 22.	Balance on hand	$28.53
" 23.	Received from state treasurer	500.00
" 22.	Samuel B. Green, bal. from membership fees, 1890	45.54
" 23.	Membership fees paid to Samuel B. Green for 1891	45.00
" 23.	Membership fees paid treasurer	6.00
June.	Membership fee, Mrs. A. Bonniwell	1.00
"	Membership fee, Mrs. A. A. Kennedy	1.00
July.	Received from state treasurer one-half annual appropriation	500.00
"	Received from A. W. Latham, membership fees	155.00
		$1,282.07
	DISBURSEMENTS.	
Jan. 23.	J. M. Underwood, expenses as ex. com	$2.50
" 23.	Mrs. A. Bonniwell, expenses to Horticultural Society	2.35
" 23.	Geo. H. Welch, janitor of hall	2.00
" 23.	A. W. Latham, expenses of ex. com	8.43
" 23.	Geo. J. Kellogg, expenses as delegate	5.00
" 23.	J. S. Harris, expenses as ex. com	13.95
" 24.	Wyman Elliot, printing, etc	10.00
" 23.	D. Day, expenses as ex. com	2.00
" 23.	L. H. Wilcox, expenses as ex. com	4 60
" 23.	M. Cutler, expenses as ex. com	2.80
" 23.	O. F. Brand, expenses as ex. com	2.56
" 23.	Wyman Elliot, salary as president	25.00
" 23.	Ditus Day, salary as treasurer	25 00
" 23.	Moffit & Thurston, printing programs	4.00
" 23.	Mrs. A. A. Kennedy, fare to annual meeting	2.30
" 23.	Ditus Day, expenses to com. meeting at St. Paul	7.33
" 23.	C. E. Young & Co., printing	10.00
		$129.82

Premiums awarded at winter meeting of 1891.

Jan.	23.	R. P. Lupton	$12.50	
"	23.	Joshua Allyn	10.00	
"	23.	Wm. Lyons	11.50	
"	23.	J. G. Bass	4.50	
"	23.	J. F. Gilmore	2.00	
"	23.	G. Chandler & Sons	1.00	
"	23.	Mrs. A. Bonniwell	2.00	
"	23.	Mrs. A. A. Kennedy	1.00	
"	23.	R. C. Keel	9.00	
"	23.	Wm. Somerville	4.00	
"	23.	J. S. Harris	8.00	
"	23.	C. W. Gordon	6.00	
"	23.	Sidney Corp	3.00	
"	23.	O. F. Brand	3.00	
"	23.	A. W. Latham	8.00	
"	23.	F. G. Gould	4.00	
"	23.	L. H. Wilcox	4.00	
"	23.	E. Kimball	2.00	
"	23.	J. S. Featherstone	2.00	
"	23.	J. W. Murray	3.00	
"	23.	R. J. Mendenhall	16.00	
"	23.	E. Nagel & Co	14.00	
"	23.	Wessling & Hartman	6.00	
		Amount of premiums at winter meeting		$136.50
Feb.	24.	A. W. Latham, secretary's supplies		$13.18
"	17.	Ditus Day, expenses as ex. com		2.29
"	17.	M. Cutler, expenses as ex. com		3.75
"	17.	J. S. Harris, expenses as ex. com		7.00
"	17.	New Eng. Furn. & Carp. Co., rent of chairs		5.00
"	17.	Price Bros., printing		4.00
"	17.	Drennan & Co., rent of dishes		1.72
"	17.	Wyman Elliot, cleaning hall		5.00
"	17.	O. F. Brand, expenses as ex. com		4.24
"	17.	J. M. Underwood, expenses as ex. com		4.50
May	5.	First quarters salary, secretary		125.00
		Premiums awarded at summer meeting.		
July	10.	Wm. Lyons	9.00	
"	10.	J. M. Underwood	6.00	
"	10.	J. G. Bass	9.00	
"	10.	N. J. Stubbs	6.00	
"	10.	D. V. Plants	4 00	
"	10.	M. M. Frisselle	3.00	
"	10.	R. P. Lupton	12.50	
"	10.	G. Chandler	2.00	
"	10.	J. F. Gilmore	6.00	
"	10.	C. L. Smith	1.00	
"	10.	C. W. Gordon	3.00	
"	10.	Mattie Lyons	4.00	
"	10.	R. S. Mackintosh	2.00	
"	10.	E. Nagel & Co.	17.00	
"	10.	F. G. Gould	2.00	
"	12.	Mrs. Ida C. Sewall	3.00	
		Total premiums at summer meeting		$89.50
July	10.	Masonic Temple Ass'n, rent hall Nurs. Ass'n		50.00
"	15.	A. W. Latham, 2d quarters salary		125.00
Aug.	21.	A. W. Latham, postage on reports		50.00
"	29.	A. W. Latham, postage on reports		25.00
Oct.	16.	A. W. Latham, 3d quarters salary		125.00
"	17.	J.S.Harris, exp. delegate Amer. Pom. Society		50.00
Dec.	5.	M. C. Burr, book boxes and shelves		26.00
Jan.	20.'92.	A.W.Latham, secy's supplies, postage, etc		154.27
"	21.	Balance on hand		145.30
				$1.282.07

The secretary then read the report of the librarian, Mr. A. W. Latham, and on motion the same was accepted. (*See index.*)

Mr. Harris: At a meeting of the executive committee last year there was a committee appointed on the library, and also there were delegates appointed for other societies. As such a delegate I have been collecting some material, a list of which I will read. (*See index.*)

Mr. Harris: In my library at home I have over 300 volumes already on subjects of interest to horticulturists, and I am adding to it every few days. I have some pretty rare books. Now, I do not want to give you the benefit of all this while I am with you, because I can talk about the things which we meet here to discuss enough to make you tired; but I hope that when I get through with you that some man will step into my shoes with the same amount of enthusiasm, and that he will keep up his efforts until you have as good a library as they have in old Massachusetts; until you will be the best organized and most wide-awake society on the American continent. Now, to be a large society you must have a library, and I intend to leave you my library when I die. (Applause.) Now, why can't we by putting forth a little effort raise the membership of the Horticultural Society for the year 1892 to 1,000. I believe there are 2,000 men in the state of Minnesota that are anxious to be invited to put in their dollar and have their names placed on the roll of the book that is to come out. Now, if the rest will take hold I will do my part, and we will have our thousand. It can be done. Now, let us do it. (Applause.)

Vice-President Wedge: We will have Mr. Harris continued on that committee.

The society then listened to the reading of the "report of Vice-President Dewain Cook, Windom, Minn." (*See index.*)

Vice-President Wedge: We will now listen to the report of Vice-President L. R. Moyer.

Vice-President Wedge: Owing to the lack of time we shall be obliged to cut this discussion short. Our secretary will now read the reports of the local societies.

The secretary then read "Reports of Local Societies." (*See index.*)

The president here announced the following committees, viz:

Committee on Legislation.....	Wyman Elliot, L. H. Wilcox, F. G. Gould.
Committee on Fruit List.....	J. S. Harris, E. H. S. Dartt. C. L. Smith.
Committee on President's Address.	M. A. Thayer. H. J. Ludlow. Dewain Cook.
Committee on Secretary's Address..	J. M. Underwood. Dr. M. M. Frisselle. L. R. Moyer.
Committee on List of Evergreens, Forest and Ornamental Trees.	L. R. Moyer. O. F. Brand. J. C. Doughty.
Committee on Award of Premiums on Apples, Grapes, Vegetables, and Pantry Stores.	J. M. Underwood. J. S. Harris. H. L. Crane.
Committee on Award of Premiums on Plants, Flowers and Honey.	Dr. M. M. Frisselle. J. M. Doudna. Mrs. A. Kennedy.
Committee on Publication.....	A. W. Latham. Prof. Samuel B. Green. L. H. Wilcox.
Committee on Final Resolutions...	L. R. Moyer. C. L. Smith. Col. J. H. Stevens.
Committee on Obituary.....	O. F. Brand. J. S. Harris. Col. J. H. Stevens.

Mr. Harris:—I move that we make a provision for having a paper read at our next meeting on planting fruits to feed the birds. Motion seconded and carried.

Mr. Barrett:—I would like to call the society's attention to the following resolution:

Resolved, That this society recommend the green and white ash as the most reliable deciduous trees for planting on the open prairie.

Mr. Harris:—I move to amend that as follows: By substituting the words "one of the most reliable trees" for the words "the most reliable tree." (*See index, "Discussion on Ash."*)

After considerable discussion the resolution was adopted as follows:

Resolved, That this society recommend the native green ash as the most reliable of the deciduous trees for planting on the open prairies.

Vice-President Wedge: If there is no objection, we will now adjourn until 9 o'clock in the morning.

Adjourned.

SECOND DAY.

MORNING SESSION, WEDNESDAY, JANUARY 20.

The meeting was called to order at 9 o'clock by Vice-President Wedge.

Vice-President Wedge: We will commence the session with prayer by the Rev. R. N. Avison, Owatonna.

Rev. R. N. Avison then offered prayer.

Vice-President Wedge: The first thing on the program this morning is the question box. (*These will be found under their appropriate heads.*)

Vice-President Wedge: The next thing on the program is the report of the committee on small fruits.

The society then listened to Mr. M. Cutler, who read a report on grapes by E. Crandall, Sumter. (*See index.*) A discussion followed. He also read a report on small fruits, by M. Cutler, Sumter, Minn. (*See index.*)

Vice-President Wedge: If there is no further discussion on this subject of the bees puncturing the grapes, we will go on with the reports of the committee on small fruits.

The society then listened to the reading of the "Report of Committee on Small Fruits," by Dewain Cook, Windom, Minn. (*See index.*) Some discussion ensued.

The society then listened to the reading of the following paper: "Small Fruits in Southwestern Minnesota," by Dewain Cook, Windom, Minn. (*See index.*) A discussion on grapes followed. (*See index.*)

Vice-President Wedge: We will now listen to the reading of a paper by Mr. Cutler, of Excelsior.

The following paper was then read by the secretary: "Blackberries in the Big Woods," by S. Cutler, Excelsior, Minn. (*See index.*) An interesting discussion followed.

Vice-President Wedge: We have present with us to-day, as an accredited delegate and representative from the Northern Iowa Horticultural Society, Mr. J. B. Mitchell, of Cresco, Iowa. He is a nurseryman, and a Russian apple man, and if any of you want to be informed on any of these points you will have a chance to hear from him soon.

The next thing on the program is a paper by Mrs. Anna B. Underwood.

Mr. Underwood: On account of the unavoidable absence of my wife, occasioned by her illness, I will read the paper which she was to read.

The following paper was then read by Mr. Underwood: "A Woman's Experience with Small Fruits," by Mrs. Anna B. Underwood, Lake City. (*See index.*)

Mr. Sampson: I move that a vote of thanks be extended to Mrs. Underwood for her very interesting paper.

Motion carried. A discussion then ensued.

Vice President Wedge: We shall have to cut this discussion short and go on with the program. We will now listen to the reading of a paper on strawberry culture,

The secretary then read the following paper: "Strawberry Culture," by John Little, of Granton, Ontario. (*See index.*)

The following paper was then read: "Raspberry Farming", by P. H. Perry, Excelsior, Minn. (*See index.*)

The society then listened to the following paper: "Business Management in Small Fruits," by M. A. Thayer, Sparta, Wis. (*See index.*)

At the conclusion of this long and interesting paper Mr. Thayer was heartily applauded. A long discussion followed.

Vice President Wedge: I am pleased to note such an interesting discussion on this subject, and if there is nothing further to be said, we will pass on to the next subject on the program.

The society then listened to the reading of the following paper: "Grape Growing in Minnesota," by M. M. Frisselle, Excelsior. (*See index*)

Mr. S. Cole Doughty: As my father is unable to be present with you, he has asked me to read the paper which he has prepared for this session.

Mr. Doughty then read the following paper, "An Amateur's Success with Grapes," by Samuel Doughty, Lake City. (*See index.*)

The paper was listened to with much attention.

Mr. Harris: I move that the paper by Mr. Daniel Buck, Mankato, on "Grapes" be received and filed for publication.

Motion carried. (*See index.*)

Mr. Harris: I will file my report on grape insects and diseases for publication. (*See index.*)

Mr. Sampson: I wish to offer the following resolution in regard to the size of strawberry boxes and grape baskets.

Vice-President Wedge: The society will please listen to Mr. Sampson's resolution.

Mr. Sampson: It is this: "Resolved, that the society recommends the adoption of a uniform size in berry boxes and grape

baskets, all growers and dealers in the United States to be governed by the same."

Mr. Harris: I move the adoption of that resolution. It is a good thing.

The motion was seconded and duly carried.

Vice-President Wedge: As it is now our usual hour of adjournment, we will close the discussion and adjourn, to meet again in this hall at 2 o'clock.

The society here adjourned.

AFTERNOON SESSION, WEDNESDAY, JANUARY 20.

The meeting was called to order at two o'clock by Vice-President Wedge.

Vice-President Wedge: The question box is the first thing on the program this afternoon. (*These will be found under their proper heads.*)

Secretary Latham: The next question is, "Should the Minnesota State Horticultural Society adopt the Director System, as practiced in Iowa?"

Mr. Dartt spoke at considerable length upon this question, and concluded by moving that the president appoint a committee to take the matter into consideration and report something definite before the close of the session. He suggested that a committee of three be appointed for that purpose. The motion was seconded and carried.

The secretary then read "A Report of the Committee on House and Greenhouse Flowering Plants," by A. S. Swenson, St. Paul, Minn. (*See index.*)

The society then listened to an interesting paper and report on the same subject written and read by E. Nagel, Minneapolis, Minn. (*See index.*)

Vice-President Wedge: Mr. Nagel is the gentleman who is showing us these beautiful flowers, which are from his greenhouses in Minneapolis.

Vice-President Wedge: The next in order is a paper by Mr. Swenson, of St. Paul.

The following paper was here read by Secretary Latham: "In what way can the Florists and the Horticultural Society be Mutually Beneficial?" by A. S. Swenson, St. Paul, Minn. (*See index.*)

Vice-President Wedge: We will now have the pleasure of listening to a paper upon that subject written by Miss Sarah M. Manning, of Lake City.

Miss Manning then read the following paper: "Our Native Shrubs." (*See index.*)

A vote of thanks was tendered to Miss Manning for preparing so able a paper.

Vice-President Wedge: We will now listen to a paper by Professor S. B. Green.

Prof Green then read the paper, "Some New Things of Value," by Prof. S. B. Green, St. Anthony Park, Minn. (*See index.*) This paper gave rise to a long discussion.

Vice-President Wedge: I will now announce the committee that Mr. Dartt suggested be appointed to consider the change in the system of organization: Chairman, Prof. S. B. Green, J. S. Harris, J. M. Underwood, L. R. Moyer and H. J. Ludlow.

Secretary Latham: If the society will give me its attention I will read an interesting paper by Prof. Cleveland.

The secretary then read the following paper "Parks for Small Towns," by Prof. H. W. S. Cleveland, Minneapolis. (*See index.*)

Secretary Latham: I have here a paper that is full of information, written by Mr. Berry, Supt. of the Minneapolis park system. (*See index.*)

The following paper was then read by the secretary: "The Planting and Care of Ornamental Shrubs and Trees," by W. M. Berry, Minneapolis, Minn. (*See index.*)

Vice-President Wedge: The society will now listen to a paper by our fellow member, Mr. Underwood.

Mr. Underwood then read the following paper: "Hardy Shrubs," by J. M. Underwood, Lake City, Minn. (*See index.*)

Vice-President Wedge: We will now listen to a paper on the red spider by one of our members, Mr. F. G. Gould, of Excelsior. (*See index.*)

Mr. Dartt: I have an announcement that I would like to make at this time. There is to be an entertainment at the Pillsbury Academy this evening to which the society is invited by the faculty.

Mr. Underwood: Mr. Chairman, I move that the society accept Mr. Dartt's invitation and attend the entertainment this evening. Motion carried.

Secretary Latham: I will now read the following paper by Mr. Swenson.

The secretary then read a paper entitled: "The Progress of the Florist's Business in the Last Decade," by A. S. Swenson, St. Paul. (*See index.*)

Mr. Underwood: I see that we have present with us today a gentleman, Mr. Mitchell, a delegate from our sister society in Iowa. I think the members of the society would be very glad to hear from Mr. Mitchell.

Mr. Harris: I would like to have Mr. Mitchell tell us something about the Russian apple. (*See index.*)

The society here adjourned, to meet at 7:30 at Pillsbury Academy.

Evening Session, Wednesday, January 20.

At 7:30 P. M. the society met at the Pillsbury Academy, and were tendered the following entertainment:

PROGRAM:

Prayer.
Address of welcome, ... Prof. J. L. Ingraham.
Piano solo—Kammen-oi-ostrow, ... Rubinstein.
Lillie P. Mork.
Oration—Arbitration . . . . . C. G. Porter.
Anvil chorus—Dumb Bells.
Vocal solo . . . . . W. T. Chollar.
Declamation—In the Arena, ... Walter Bucksen.
Club swinging.
Vocal solo—I am a Warrior Bold, ... Mendelssohn
Prof. W. A. Shedd.
Declamation—The Rebel Yell, ... Chas. Spratt.
Vocal solo—Love's Sorrow . . . . . Shelley.
Arthur Aldritt.
Recitation—The Kitchen Clock, ... Miss Hayes.
Address of W. Elliot, Esq., ... Read by Vice-President Wedge.

Morning Session, Thursday, January 21.

This morning was devoted to a union meeting of the Minnesota Bee-Keepers Association with the State Horticultural Society. (*See report of Bee-Keepers Association.*)

The Bee-Keepers having adjourned, and the Horticultural Society was called to order by Vice-President Wedge.

Vice-President Wedge: The first thing on the program this morning is the president's address, which I will now read.

The president's address was then read to the society, and was received with much applause.

PRESIDENT'S ADDRESS.

WYMAN ELLIOT, MINNEAPOLIS.

Mr. President, Ladies and Gentlemen:

What a vastness there is in our theme. What an amount of centralization of mental and manual effort is being put into every department of horticulture! Did your ever think how many hours of effort of mind and toil of body have been devoted to developing one of our commonest fruits from its native habitat into the improved variety of the present day? The present perfection of the useful trees, fruits and flowers of our orchards, gardens and conservatories has not been brought about without special attention to the development of all the essential features and marked peculiarities of their structures.

Take, for instance, the king of fruits, the apple. How many billions of thoughts and hours of labor have been devoted to the perfecting of this one fruit for hundreds of years in the past, and still we are only in the infancy of its development, in point of hardiness. Its distribution is being extended each decade and a wider breadth given to its usefulness as a food product.

The wonderful adaptability of this fruit tree to climatic changes has not been brought about without a vast amount of labor, toil and drudgery by the diligent, industrious workers in pomology. This transformation has been a gradual growth through a series of progressive changes, point by point; difficulty after difficulty has been overcome; and at the present time we have great hopes of extending its limit of growth and fruitage to much higher latitudes on our continent, that are now considered uncongenial to its successful cultivation.

These improvements in hardiness and productiveness of tree, and quality of fruit, have been largely wrought by specialists who have given their time, talent and money, without stint or reward, with the true spirit of devotion to a noble cause.

Extend the range of perspective vision still further, and gather in all the different fruits, large and small, in all their varied forms, and then you may have some conception of what it means to have a society whose purpose is to give fostering care to all the various industries that cluster around the prospective growth of horticulture in our state.

It is said, "Necessity knows no law;" where there is a will, there is a way to overcome the tantalizing disappointments that have marked our efforts in the past. Many times we have had the problem of fruit-tree raising, as we thought, almost solved, but like a Phrygian king in fabulous history, who was condemned to stand up to his chin in water, with a tree of fair fruit over his head, both of which, as he attempted to allay his hunger or thirst, fled from his approach, thus always the unexpected has happened to blight our hopes.

In no other calling is there greater need of combining science with practice, than in horticulture, and to-day those who are counted among our most successful cultivators are those who have conducted their experiments the most carefully along the lines indicated by the true principles of science.

It is a good rule for all young, and for that matter, old people to adopt, "Never be afraid or ashamed to ask questions, and be ever on the alert to

seize upon favorable opportunities, which, like fruit, should be plucked before they are too ripe."

Horticulture, like small children, must be carefully cared for in infancy if it is expected to thrive and prosper in a climate like ours.

LOST OPPORTUNITIES.

I once heard a good pastor say that hell was paved with lost opportunities. Neglect always runs before ruin; waiting for *best* opportunities never made any man rich. "Do for yourself, and wait for no one to perform for you what you can yourself do," should be the maxim of every young person in the beginning of life. One effort successfully made, helps to a more successful one the next time. Seeking, searching, endeavoring to do something, effects more in the battle of life than any one other thing. Inquiring, courageous minds and willing, skillful hands, working together, overcome many of the obstacles that beset every ambitious man's progress in life. Prompt, ready, expeditious,—these constitute real worth in pursuit of *any* business.

Slothful, neglectful, dilatory methods never execute or accomplish much or place any one on the right road to success. Judgment; not the kind that Shakespeare speaks of when he says, "This judgment of the heavens that makes us tremble;" but that kind that discerns, penetrates, discriminates, or tends toward successful management in the prosecution of any kind of employment or occupation, should be early and zealously cultivated. To illustrate: When I see unclean crops of any kind, overgrown with weeds, I think and say, "There is a lost opportunity for an abundant crop;" when I see neglected farms and gardens, "There is a lost opportunity for success;" but when I visit a place and everything shows tidiness, cleanliness and neatness, I at once have a feeling of confidence that every opportunity is being cared for and improved to the uttermost.

Faith, courage and ability to accomplish whatever is undertaken, are the most essential elements of every person's success. Without these, there is a vague uncertainty surrounding every important or lesser transaction. The success of any enterprise depends more upon the energy and foresight exercised by the person in charge than upon the inherent qualities of the business itself. Wise management and skillful manipulation are cardinal factors that must be continuously adopted that the best results may be reached.

The above should be indelibly impressed upon the mind of every young person embarking in any business career.

RECIPROCAL IN THOUGHT AND KNOWLEDGE.

To derive the greatest amount of mutual benefit from discussions and papers read, we should be reciprocal in the interchange of useful, helpful ideas, and information. Each should strive to be a bureau of mutual exchange of considerate, thoughtful intelligence upon the best methods and means of economical production and sale of produce. We should strive to cultivate the closest intimacy and fairness in all our relations and dealings one with the other. We should deal honestly with the land, returning a proportionate amount of enrichment, to supply the place of that abstracted in the growing of crops. Many times it is not the sterility of the soil that needs fertilization, but successful remedial

treatment should be applied to the great centre of sensation and perception (the brain) by more thorough application and cultivation. Too often it is not the unproductiveness of the soil that is the cause of unprofitable crops and returns, but the lack of the proper attention at the right time.

The old saying, "Anything that is worth doing at all, is worth doing well," should be a characteristic trait with all true lovers of horticulture, for of all the industries that occupy mankind, those dealing with the sensitive structures of living organisms should be most enlightened, thorough and careful in whatever they undertake.

It is a notable fact that all are human, and horticulturists, like other men, inclined to do their work the easiest, shortest way, regardless of consequences. The choice of will, under certain restrictions, is given to every person, but with most people, circumspect penetration, sagacious judgment can only be attained by long years of practical experience, and where the variations of seasons and soil are so great that no systematic or fixed rule of procedure can be arranged, *these* must become cardinal factors in every kind of tillage.

DEPENDENCE OF SUCCESS.

I wish to impress this one fact upon the minds of all the members of our society,—that the permanence of its prosperity, financially, socially and instructively, will be in proportion to their unwavering, constant, loyal devotion, with energetic personal efforts, and anxious, watchful care for the present as well as the future prosperity of the horticultural industries of our state. The success of our society in helping solve the intricate problems that a northern climate presents, does not depend so much upon its officers as the individual efforts of its members, working as specialists, in their several lines of work. Unforeseen obstacles may, for a series of years, bar our pathway to success in the pomological development of horticulture, but ultimate success like a river will find its way to the sea, in spite of every opposition, if we but use our energies of mind and hands properly in studying the causes and effects governing the characteristic natural laws of production. We may theorize, speculate or conjecture what is the cause of so many failures in growing of the larger fruits, but after all we have to fall back upon practicable means for producing fruits under such adverse circumstances as are to us continually presented.

OVER-PRODUCTION, ETC.

We often hear the cry from fruit and vegetable growers that "overproduction is the true cause of prices being less than the cost of raising and preparing for market." As a whole, there never has been, for a succession of years, enough of fruit and vegetable produce to supply what the people of our land demand. It is concentration of large quantities at certain points of distribution, that gives this impression, and when we have studied the most economical methods of even wider spread distribution, there will be no complaint of over-production. There is no farmer's, mechanic's, artisan's or laborer's table but what should be supplied with all the ripest, richest of mother earth's bounteousness. When our people learn true wisdom, in consuming more fruits and vegetables, and less sweetmeats, adulterated confectionery, and fat meats, their doctor's bills will grow less, and physic will not be so much in demand.

A *thought for the future* is what most cultivators lack. In all their planning, they do not look far enough ahead, or close enough, to see what the markets in the future will demand. At all times, certain unforeseen contingencies should be provided for and overcome, if possible.

Many think because crops are very abundant and low-priced one year that they always will be, but such is not the fact. A good rule for the energetic, industrious horticulturist is to always have plenty each year; then when there is a scarcity, good, round prices will be obtained, and he will reap his reward, to offset the years of abundance and low prices.

COST OF PRODUCTION.

How many of our horticulturists can tell how much the different crops cost to produce ready for market? All growers, whether of fruits or flowers, should be so well posted that they can make an accurate estimate of the profit received from each variety grown, thus enabling them in the future to guard against possible loss. This can only be done by keeping detailed accounts with each crop grown, which can be done with a little time and care, expended each day through the growing season. Many a man, adopting this method, would thus be enabled to stop the leaks and losses and show a better balance sheet at the end of the year's operation.

This has been a phenomenal year for large crops. The records of some are world beaters. Yield of wheat from a measured acre, 62½ bushels. Yield of potatoes on the farm of C. H. Bullock, Northfield, was 1,120 bushels, of the variety known as Potentate. They were sold for $336.00 at the low price of 30c. per bushel. Mr. Bullock is not a novice in potato raising, but has given it his close attention for years; hence his success.

Red raspberries—Mr. E. T. Warner, Grant, Minnesota, near White Bear Lake, from one-fourth acre of Turner, red, picked 1,500 quarts that averaged him 14¼c. per quart ($220.75). A record was kept of every day's picking and sales made, so there was no guess-work. Season of picking, from June 27th to August 3d.

Who says that farming and gardening does not pay when conducted in an intelligent and energetic manner?

From all the information gathered, the fruit crop of 1891 has been unusually large in nearly all sections. Small fruits were very productive, and extremely fine in quality. Plums were more plenty than has been known for several years. Grapes have been very prolific; apples, pears and peaches have borne most abundantly in almost every section where cultivated.

Many new fruits have made their first appearance with us this year. Some of the new imported fruits have stood the test of our climate extremely well. Among them, the persimmon, from Japan, is reported to be hardy enough for this latitude. We will know better on further trial.

An extract from the Agricultural Report of 1891, is:

"One of the problems in pomological circles is, how to secure a class of apples for the northwestern states, that can endure this northern climate. It is claimed that while much good is accomplished by cultivating the Russian apples, it is found that they do not prove as successful as was hoped.

"Can we sanction this, by our own experience with reference to the best Russian varieties, or are there not many kinds that will prove quite an

acquisition to our list of hardy apples? Shall we not, in the near future, pay more attention to propagating new varieties of the apple, by cross-fertilization of the best Russians with our own new and native seedlings, experimenting in selecting and sifting, continually, the best, until really valuable varieties may be obtained."

By many of our most experienced pomologists, it is claimed that the most valuable apples that we have were developed on our own soil, in the way above indicated. It is well for us to push all lines of experimentation in apple-growing with native seedlings and imported varieties from all lands where their climatic condition is similar to ours, and by this means we shall eventually produce varieties that will be hardy and adapted to our soils and climatic changes.

The experimental stage of horticulture will never end as long as there is a new plant to be cultivated or a new theory to advance. Experience, that great teacher of facts, reminds us that attention should be given to the subject of furnishing new and helpful information which would be valuable to our members (and the great mass of uneducated) in their work of growing trees, fruits and flowers of all kinds. We should seriously consider how can instructive horticultural literature that will afford the greatest benefit, be put into the hands of the masses in the most economical manner. A new method has been suggested recently by means of a leaflet containing condensed, reliable information on the best methods of specific and general cultivation, giving the names of species and varieties that are best adapted to being grown in our latitude; their habits, time of fruiting, keeping qualities, the most economical modes of use: together with the most recent discoveries, and directions on planting, cultivating, pruning, protection, etc. These lists should be applicable, as far as possible, to all the northwestern states, and should include only varieties possessing the most estimable characteristics of quality, fertility, productiveness, growth and hardiness, according to the past experiences of our most successful cultivators. These leaflets should go with another prepared by our secretary, seeking information from every citizen of our broad commonwealth, requesting the name of every person that cultivates a square rod of ground with fruits of any kind; also the name of the varieties, as far as known.

These two folios should be drawn up by the most experienced experts in every line of horticulture, embodying a compendium of questions and information such as has never been presented to our rural population. This information can be classified and made very useful in the campaign, for seeking all the best varieties of fruits, and other products, for the Columbian World's Fair Exhibition.

WORLD'S FAIR.

The preliminary arrangements by our society, for taking part in the horticultural department of that great exhibition of products, should be attended to in detail, at this time, if we expect to properly represent the bounteous productiveness of our soil and climate. This whole matter should be put into the hands of a competent committee, who should act immediately, in co-operation with our State Superintendent of World's Fair Exhibits. We should also recommend and urge the appointment very soon of some person to take full charge of the industries that this society represent. The interests of every citizen call upon him to lend assistance as in his power lies.

In the words of John Thorpe, taken from a paper read before the Horticultural Society of Chicago, October 3d, and printed in the American Florist of October 8th. "Let us do everything on a scale equal to the magnitude of the undertaking." He further says: "I venture to suggest to our society (and not only to it, but to all state societies, all other horticultural societies and to all florists' clubs) a plan to raise funds for special purposes, to create and maintain meritorious displays from different localities. State societies could, through assemblymen, ask for a special appropriation of a good round sum from their legislatures. Horticultural and florists' clubs could collect subscriptions from those interested in floriculture (and kindred industries.) I suggest that a certain portion of the funds thus obtained, be set aside for the obtaining, collecting, transporting and maintaining of such exhibits, which may be collected for the World's Fair; the greater portion, however, to be distributed in gold and silver medals, or such other premiums as may be decided upon."

Now, this plan, as suggested, may be feasible, but to prosecute it to a successful issue, much time and money must be spent in its accomplishment, and the large amount of detail work will be burdensome to many. We have been requested by our own State World's Fair Commissioners, to state for what purpose we expect to use so large a sum of money as we have desired, namely $15,000, or one-tenth the sum that is expected to be raised for exhibiting all the fruits, native and cultivated, and all vegetables used in truck gardening, floriculture, and the manufactures used or products derived from these industries, or immediately connected with them. At the proper time our secretary is prepared to present a very complete approximate estimate of what it will cost to make such an exhibit as would be of value, that our state may derive the benefits from judicious advertising of the possibilities of our various resources.

AMERICAN NURSERYMEN'S MEETING.

One notable event of the past season was the assembling at Minneapolis of the American nurserymen from all parts of the United States, and some foreign countries were represented, They came here to our state, upon invitation being extended to them by this society. There were over one hundred delegates present, many of them accompanied by their wives and daughters, or friends. They were much pleased with the cordial reception and attention extended to them by the members of our society and citizens of our state, in showing our fine buildings, manufacturing industries, parks, boulevards, drives, etc., thus giving them some conception of the possibilities of our new northwest; and on our part we very much enjoyed their short sojourn and acquaintance. On the whole, we think our mutual relations have been rather benefited than otherwise. The following is from president Emery's letter:

LAKE CITY, MINN., June 9, 1891.

Mr. Wyman Elliot:

DEAR SIR: Yours of the 8th received, and you got the start of me, as I intended to write you the first chance I could get, and endeavor to express to you my appreciation of all you did, together with your friends, in the interest of the meeting just had. I can truthfully say that in my experience with this association, dating from 1883, nine consecutive meetings, that we have never had so enjoyable a time, nor so interesting a session. This feeling is not common to me, but is the universal expression of every one who was at Minneapolis. The final resolutions will tell

the story. (See proceedings of the 16th annual meeting of the American Association of Nurserymen, held at Minneapolis, June 3, 1891. Page 118, Report of Committee upon Final Resolutions.) You ought to have sufficient copies to deliver to all the people especially interested. Thanking you for all done, I am,

Yours truly,
S. M. EMERY.

ORGANIZATION OF CLUBS, ETC.

Organization of horticultural and kindred societies, for the dissemination of improved methods and information that will be beneficial to every tiller of the soil, is what should be considered of the utmost importance to the members of our society. It would be the means of giving us an increase in membership and influence, such as no other method would. Every school district throughout the length and breadth of our state should have its farmer's and gardener's club, where the farmers and their wives and boys and girls could come together every week or month, and interchange ideas and methods for more economical management of all the various industries in which they are interested. Papers could be prepared, read and discussed as to the most important means of securing a condition of improvement upon the farm, garden, and in the household; and once in three or six months, or oftener, if they choose, some talented person, specially skilled in some industry, could be procured from abroad, to enlighten with practical wisdom the home talent, thus increasing the knowledge which everyone in this day and age so much needs, to keep step with the rapid progress and development of economical living. This class of education will help round out and bring into action the special endowments of each individual that takes part in these short debates upon familiar home topics. Every school district possesses talent and intelligence enough among its population to furnish a first-class entertainment semi-occasionally, if they will only get together in a business-like manner and do a little systematic planning. It simply requires one or two energetic, enterprising people to lead off by taking immediate action in forming a club, and the rest will follow, as one sheep follows another over the stone wall.

Hereafter, in holding our summer meetings, let it be one of the conditions that the people desiring us to come to their place of residence for this purpose, shall organize a horticultural society in their town, to be auxiliary to and co-operate with the State Horticultural Society; the same conditions to hold good with reference to our winter meetings, except the years when the legislature is in session.

A meeting in joint session, of the presidents, secretaries and executive committees of the State Horticultural Societies of the several adjoining states, the Dakotas, Iowa, Wisconsin, Manitoba, should be advocated, the time to be arranged by the secretaries. This, in connection with the circular letter received from T. T. Lyon, should be acted upon by our society.

FORESTRY.

Col. Thomas W. Knox says, "Let every boy bear in mind that the forests are our best friends; that they prevent drouths, or greatly mitigate them, and have the same influence upon floods." Also see "Forest and Garden," Vol. 4, page 574.

"The forest crop is the great agricultural crop of the country, most important in itself, as also in its relation to other crops. The problem is

confronting us: How shall this crop be maintained in adequate measure when consumption is increasing, while the area of ground occupied by trees is decreasing, because of the demands constantly made upon it for tillage purposes?"

It is a very grave question we are called upon to consider, the relation of trees and their effects upon climate, to the whole business of agriculture, and one that should receive the attention of those most skilled in deforestation and preservation. Meteorologists should study what will be our climatic conditions when this vast area of forest growth that skirts the northern boundary of our state and tempers the cold winds that sweep down from the north, shall all be laid low by the woodman's ax.

If we ever expect to derive any benefits in the far future from a reservation of any extent or magnitude, it must be set apart now and at once, before the onslaught of tree vandalism has taken possession. We should reserve large portions of this area, with such restrictions to govern its care and management as will conserve the best interest of the present as well as the future generations of mankind. We should use a little foresight in matters of so great importance to the future agricultural industries of our state. "It is no use putting up the bars or locking the doors after the horse is stolen," will apply to this question of forest preservation very well. I will ask where is there a more appropriate place for an extensive experiment of forest growing under government control, than in the northern part of Minnesota, and one where there is so great need of preserving the ameliorating effects of climatic conditions. We should bury selfish local interests out of sight, when we consider them beside one that will be of such great benefit to the future generations that will occupy the territory of agricultural lands to the south and west of this large area. Cogent, convincing resolutions should be passed by every industrial organization that professes to be in touch and sympathy with the conservative interests of the larger portion of our population and the future widespread prosperity of our great state.

LIBRARY.

The library of any society or organization is the receptacle of recorded thoughtful expressions, experiences and successes, and *thoughtless* failures. A society without a typical literature is also without a history, and destitute of hope and aspiration. Our annual reports from the beginning constitute the golden chain that binds the past, present and future generations of co-workers together. It is truly said, "Civilization received its most powerful impulse when the thought of a library was first born into a race. Ptolemy Soter, the Egyptian monarch, lives forever enshrined in the affections of mankind as the founder and builder of the Alexandrian library, while Caliph Omar's name will descend in ignominy to the latest generation, as the destroyer of this invaluable collection of the utterances of men."

The man who writes or utters a new fact, principle, practical experience, trial or observation, or causes a useful book to be printed, becomes the benefactor of his fellows forever, and the benefits of his pregnant labor increase and grow strong as time progresses.

There is no reason why a person having intellectual capacity to comprehend, with proper application, should not be thoroughly acquainted with the best books relating to his avocation. Natural inclination is not inher-

ent in all men, but like every other accomplishment, a taste for reading may be cultivated and acquired, and when a person has decided what his ideal employment for a livelihood will be, and becomes thoroughly enamored with his work, the more good books he reads, understandingly, the better qualified he will be for accomplishing whatever is undertaken.

Every horticulturist and farmer should have his family library. The substantial foundation of every man's success is in possessing the most recently developed information of useful facts relating to his calling. Public libraries are excellent as public aids to culture, but can never take the place or have the economical helpfulness of the ever-ready, well-selected family collection of books and papers, giving specific information upon facilities, inventions and verified facts, for promoting intelligence in their special industry.

The true basis of usefulness and prosperity to the members of our society, is the formation of a horticultural library of recorded accumulated information that will ever be added strength and intelligence in moulding the thoughts, progressive growth and characters of its members and their children. It will be the cementing friendship, love and mutual helpfulness that will bind them together with common interest and be the uplifting of all horticultural progress.

It is truly said, "Books are to be made useful accessories in the discharge of life's duties, amusing companions, partners in the failures and triumphs of existence." That mature or immature man or woman has lost the best aids and helps of earth's pilgrimage who has not courted their friendship and won a victory over the habit of disinclination to investigate the natural and scientific laws of production and sustenance.

A wise man once said, "It is not how much we can read, but what kind we read, and how we read, that gives us the greatest beneficial worth, the most intellectual development." The great object should not be how many pages can be run over superficially, but read for the purpose of retaining in the memory that which will be of use as helps in our peculiar employments.

The best investment for a farmer or gardener is to take a good agricultural and horticultural journal. Time wasted in reading New York Ledgers and yellow covered literature, could be put to more profitable use, if it was spent in reading that which would be of value in helping us gain an honest, manly living.

RUSSIAN.

As yet it is a mooted question in the minds of many horticultural physiologists, what value will be derived from commingling the foreign fruits with our own native varieties, where we have contending elements to battle against, as here. Andrew Fuller in his "Propagation of Plants," says: (*Page 132.*)

"We may, among fruits, secure size, color, texture, in fact, all the good qualities known to belong to or exist in certain species, and still these will be of little value unless the plant itself is adapted to the soil and climate where it is to be cultivated. In fact, adaption is all that is sought or can be credited to what is termed acclimatizing of plants and animals, for it is scarcely to be supposed that the constitutional characters of the individual plant or animal can be greatly or permanently affected by a removal from one climate or condition to another. One variety of plant

may be more hardy, and safely endure many degrees lower temperature than another of the same species, but no amount of nursing or moving about will ever change a tender plant or animal into a hardy one. But by introducing new elements, as in cross-fertilization, we multiply the causes for wide variation through the different hereditary characteristics of both parents. Then by selection and propagation of such cross-bred varieties as are worth preservation, we are often able to secure those adapted to widely different conditions, as seen among all of our long-cultivated and widely disseminated plants. Why the seeds from a plant should yield both tender and hardy varieties, can only be accounted for upon the hypothesis that each possesses transmitted hereditary characteristics, but of the nature of the laws that control this transmission, we know little or nothing.

"However well informed a person may be in regard to the structure and habits of plants, and extended his experience, and perfect the contrivances for propagation, he must likewise possess skill and patience, and exercise great care and watchfulness in every operation, if he will become a successful cultivator and propagator of plants in general. A person may know just how an operation should be performed, and still lack the necessary skill for its execution."

The efforts of these pioneer fruit growers will be a leaven that will stir the souls of the future generations of tillers of the soil to grander, nobler endeavor, because we believe them to have been honest, sincere, earnest and true to the cause they espoused and so nobly defended; they spoke the truth and lied not, and the seed they have planted will ripen into a generous fruitage.

Vice-President Wedge: We will devote the remaining 15 minutes of this morning's session to forestry.

Mr. Barrett: This paper is in response to the request of our president and the friends of forestry throughout the state.

Mr. Barret there read the following resolutions drawn up by the committee appointed on "The Forest Reserve."

RESOLUTIONS ON THE FORESTRY RESERVE.

"We maintain that our public woodland in the northern part of our state should not be monopolized for personal gain to the injury of the people at large, but should be reserved for the continuance of our lumber and agricultural industries, for protection against the polar winds, and for a great reservoir to feed our rivers and lakes, which are now fast drying up. We therefore respectfully urge the essential claims of the proposed forest reserve known as the Minnesota National Park, with the necessary modifications of its boundaries, and under these provisions:

1. That, besides the land agent's service, a board of forest reserve commissioners, who are posted in scientific forestry, should be appointed by the national government to inspect the public woodlands in Minnesota, their land configuration, water bearing strata and capacity for dense forestation to conserve evaporation, and locate a public timber reservation in compact form, or in large, separate compact tracts at and around the water sources, mainly of the Red, Mississippi and St. Louis rivers; to which should be added all poor lands of public domain which are officially

pronounced unfit for profitable agriculture, and that the whole area of said reserve should not, in our opinion, be less than 2,000,000 acres, and as much more as in the judgment of the commissioners is practically necessary to secure the objects here stated, and make their report to the president for final action.

2. That all other woodlands of the public domain in Minnesota which are officially pronounced agricultural should be open to settlement.

3. That prospecting for and opening of mines and railroads into and through said reserve should not be restricted; that the reserve timber should be cut only by the government or parties licensed by the government, under strict and equitable laws, and the manufacture of wood material should be permitted and encouraged in said reserve.

4. That we urge the immediate organization of a competent forest administration, equal in efficiency to that of Germany, having soldiers of the United States army for police forces, under a scientific corps of forestry officers, whose duty shall be to exclude trespass and fires, and supervise the cutting in an economic way of the valuable varieties of woods, which by proper culture shall be kept vigorously growing, so the headwaters will be protected, the demands of our people continuously supplied, and a perpetual revenue secured from land which under the present system does not pay taxes."

After a short discussion the resolutions were adopted by vote of the society.

Mr. Smith: I move that the secretary of this association be instructed to forward a copy of these resolutions to the different boards of trade and other organizations interested in the subject of forest reservation, to our representatives in Congress; to the President of the United States; to the Department of Agriculture, and the Secretary of the Interior. I do not mean that he should wait until our forthcoming report to do this, but that it should be done as soon as practicable by the secretary of this association. And I move that the secretary be instructed to forward a copy of the resolutions to the above named parties and to such others as it would be deemed advisable to send them to. Motion seconded and carried.

Mr. Dartt: I am authorized to extend an invitation to the members of this society to visit our State Public School sometime during your stay here. I hope the members of the society will accept this invitation, as I am sure the visit would prove very interesting.

Mr. Underwood: I move that the society accept the invitation, and attend in a body at 4 o'clock. I also move that we convene at 1 o'clock instead of 2 o'clock in order that we may get through our program in time to make the visit.

After a short discussion the motion was carried.

The society here adjourned to meet again at 1 o'clock P. M.

AFTERNOON SESSION, THURSDAY, JANUARY 21.

The meeting was called to order by Vice-President Wedge at 1 o'clock.

Vice-President Wedge: I believe the first thing on the program is the Question Box. (*These will be found under their appropriate heads.*)

Vice-President Wedge: The society will now listen to the report of the committee on award of premiums. (*See index.*)

Mr. J. S. Harris then read his report as a delegate to the American Pomological Society at Washington. (*See index.*)

Vice-President Wedge: We have with us this afternoon, Col. J. H. Stevens, one of the founders of this society, who by reason of circumstances over which he has no control is not able to be with us this evening. So the society will now listen to the address which Col. Stevens had prepared for this evening.

Col. Stevens then read the following paper which was listened to by the society with much attention:

TWENTY-FIVE YEARS IN THE MINNESOTA STATE HORTICULTURAL SOCIETY.

COL. J. H. STEVENS, MINNEAPOLIS.

Mr. President, Ladies and Gentlemen:

The mile post of a quarter of a century is reached since the organization c our society. We trust our labor has not been in vain—patience and perseverence has been our motto. We celebrate this anniversary under favorable auspices. The Minnesota vine produces many varieties of grapes. The quality of this fruit is superior to that of a more southern product. We have great hopes for the future apple. True, we have met with many sad disappointments in its culture, but already we are assured of the success of a few varieties, and trust that through the efforts of our organization the future list will be greatly increased. Should the *pyrus malus* fail us we have only to fall back on the Siberian, which is impregnable.

We produce prolific crops of small fruits. Our strawberries, currants, raspberries, gooseberries, blackberries and blueberries cannot be excelled. We have not made the progress we hoped for in plums; nor can we boast of our cherry, but still those of a native birth of the former and the Russian of the latter, promise a fair supply of each. The peach and pear industry still baffles our ingenuity, but we do not despair. T he eran pomologist, Peter W. Gideon, of Excelsior, has defied our hyperborean climate in relation to the product of the former and as usual we fall back on the Russian, with hopes for the future in regard to the latter. Much attention is bestowed to the shrine of flora. Flower gardens and lawns are common; magnificent climbing vines, scarlet lilies, fragrant roses, the royal dahlia, the fuchsia, double petunia, geranium, heliotrope, hyacinth, pelargonium, gladiolus, verbena and kindred varieties of flowers abound. Spring is welcomed by the lilac and the crocus, followed by the honest dandelion. As summer approaches, the country is full of choice, delicate, beautiful flowers.

The labor of the society in relation to transplanting shade and ornamental trees has been crowned with success. The maple and elm so beautiful in New England are not less so in Minnesota. Then the linden, hackberry, coffee tree, the white and golden birch, skirt our fields, fill our yards, the home of singing birds; the mountain ash, the green-boughed pine, cedar, spruce, balsam and other evergreens adorn our homes, which, with ornamental shrubs, the flowing almond, the acacia, barberry, snow ball, spireas, syringa and holly-leafed shrubbery makes the rural life as near perfect as can be reached by most of us.

The society had a great work to accomplish. The mission was not simply the propagation of fruits, but to add comfort and beauty to every fireside in the commonwealth. At the commencement it was determined as far as possible, to make every home cheerful and happy; to banish weeds and ragged grasses from every door yard, and substitute, in lieu thereof, damask roses, green lawns, climbing vines, blooming asters, evergreens and other pleasant things to our homes.

Have we succeeded? I hope so. We all have worked hard for the benefit of the present and future generations of the state; worked without money, without price. We do trust that our efforts are appreciated by the present people, and hope our labor will be beneficial to those who are to follow us.

Many of our primitive members have crossed the silent river, some have moved to other lands. The few of us living who were charter members, are now old men. Our work will soon be finished, but we will never cease, while we are of this life, to labor with all our strength for horticulture, and all that appertains to it in Minnesota.

Mr. Smith: Some of us can appreciate the interest that Colonel Stevens has in this horticultural society by the fact that he has come from his home to-day under the circumstances that he has, to meet with us for only so short a time. I know that every one of us has enjoyed this most excellent address he has read, and that we appreciate the lively interest he has always taken in the work of this society. As an expression of that appreciation, I move a rising vote of thanks to Colonel Stevens for this paper, and for his attendance here to-day.

Motion carried.

Colonel Stevens: Mr. President and fellow members of the State Horticultural Society: I feel deeply gratified at this expression of the society. I expected to be here at the commencement, but other matters over which I had no control prevented me. I have never shirked my duty, and I never intend to. As long as I am alive I certainly shall be with you on every occasion. (Applause.)

After a short discussion it was voted that the reports of the delegates to the Wisconsin and South Dakota Horticultural Societies be placed on file and printed in the annual report, lack of time rendering it impossible that they be read. (*See index.*)

Vice-President Wedge: The society will now listen to the report of the executive committee, by Mr. J. M. Underwood, chairman of that committee.

Mr. Underwood: The executive committee are happy to report that they found the accounts of the treasurer correct, and that the books are in a satisfactory condition. They have the following recommendations to make: first, that there be a committee appointed on life memberships—a permanent committee to which all matters referring to that subject shall be turned over. Second, they recommend a change in the time of holding the annual meeting to the second Tuesday in January. They would like if possible to prevent our society meeting at the same time that the Iowa state society meets, and they have discussed the matter very thoroughly, and considered various times at which it is possible to hold a meeting. December seems too early, unless it comes at the holiday season, and February is too late for us. It is the opinion of the committee that the second Tuesday in January would be the best time for the society to hold its meeting.

The committee recommends also the election, as recommended by President Elliot, of Messrs. E. Nagel, Minneapolis, A. S. Swenson, St. Paul, and W. A. Manda, Short Hills, N. J., as life members of our society, in consideration of their display of chrysanthemums at the chrysanthemum show held at Minneapolis last year, where, among the various premiums offered, were three life memberships in the State Horticultural Society. It is the opinion of the executive committee that our Society should vote these three life memberships to these three gentlemen, and the committee so recommends. Fourth, that the executive committee be instructed to audit a bill for a shorthand reporter, not to exceed one hundred dollars annually. In other words, that the society appropriate one hundred dollars of its funds—not more thanthat—for paying the reporter, so as not to require the secretary to pay for that work out of his salary.

Vice-President Wedge: You have heard the report. What will you do with it?

Mr. Smith: I move the acceptance and adoption of the report.

The motion was seconded and carried.

Mr. Sampson: Does that $100 raise the secretary's salary that amount?

Vice-President Wedge: The secretary has been paid a certain salary, and out of this has been obliged to pay the short-

hand reporter. Now the shorthand reporter is to be paid a certain amount, not to exceed $100.

Mr. Barrett: I think the motion is a just one, for the salary of our secretary ought to be double what it is now. I hope for one, that the committee to which is assigned the responsibility of procuring of the legislature more of an endowment, will see that their duty is faithfully discharged. I most heartily endorse this proposition.

Vice-President Wedge: I have a letter here from H. E. Van-Deman, of the United States Department of Agriculture, Washington, which I will read:

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF POMOLOGY,
WASHINGTON, D. C., January 16, 1892.

John S. Harris, La Crescent, Minn.

DEAR SIR: In reply to yours of the 8th, I will say that it would afford me the greatest pleasure to be present at your meeting next week, but this is absolutely impossible. I have long desired to attend one of the Minnesota meetings, but every year something comes in to prevent it. I am now very busily engaged in trying to get the work up so I can fulfill my promise to meet with the Pennsylvania Horticultural Society next week. The annual report is just done, and your letter, with others, has been awaiting my attention. Please remember me to the many friends in your state, and rest assured that Minnesota is not forgotten.

Very truly,
H. E. VAN DEMAN, Pomologist.

Mr. Barrett: As President Elliot has served the society for several years in a most satisfactory manner as a president, and a member, we offer the following resolution:

Resolved, That our hearty thanks be tendered to Mr. Wyman Elliot for his unfaltering efforts in promoting the fruit interests of Minnesota, and his faithful discharge of the trust reposed in him, as one of our pioneers in horticulture and forestry, and we avow our purpose of keeping his good example before us, in advancing his work for our successors to take up and enjoy.

The motion was duly seconded and carried.

The society then proceeded to the annual election of officers.

The following tellers were appointed: Charles S. Sampson and R. S. Mackintosh.

Mr. J. M. Underwood, of Lake City, was elected president for the ensuing year. Being called upon, he spoke as follows:

Fellow members of the State Horticultural Society: I assure you that I appreciate the honor you have conferred upon me. It is a great honor to be chosen president of this association. I feel, however, that the responsibilities of the office are such that I would be very much more pleased if they had been con-

ferred upon some one else. I know that my predecessor has been such an able and successful officer of this society, that it must necessarily be a critical and arduous task for any one to-day to pick up the work where he has left it. I accept the position, with the full and clear understanding of the responsibilities that devolve upon me, and I shall necessarily need your sympathy and cordial support, which I trust will be given to me as freely as it has been given to Mr. Elliott. I again thank you for the honor you have conferred upon me.

On motion, the secretary was instructed to cast a ballot for the election of Mr. Clarence Wedge, as first vice-president of the society. Mr. Dewain Cook was elected second vice-president in the same manner.

Mr. L. E. Day was elected third vice-president in the same way, and Mr. Roger S. Mackintosh was elected fourth vice-president.

Mr. Harris: I move that the secretary be instructed to cast a unanimous vote of this society for Col. J. H. Stevens as vice-president for the 5th district.

The motion was duly carried and the secretary cast a unanimous ballot for the election of J. H. Stevens as vice-president of the society for the 5th district.

The secretary then cast a ballot for the election of Mrs. Jennie Stager, of Sauk Rapids, as sixth vice-president.

Mr. J. O. Barrett was elected seventh vice-president in the same way.

Mr, A. W. Latham was re-elected secretary by unanimous ballot cast by the president

Mr. Ditus Day was re-elected treasurer.

The following executive committee was then elected: Wyman Elliot, J. S. Harris, S. B. Green, O. F. Brand, L. H. Wilcox.

Prof. Otto Lugger was then elected entomologist, and Secretary A. W. Latham was re-elected librarian.

The society then listened to the following paper: "The Horticultural Exhibit for Minnesota at the World's Fair," by A. W. Latham, Secretary.

HORTICULTURE AT THE WORLD'S COLUMBIAN EXPOSITION.

A. W. LATHAM, EXCELSIOR.

All the arguments that can be advanced in support of a general exhibit of the resources of our state at the Columbian Exposition about to be held at Chicago, apply with equal force to that portion of it embraced by the term horticulture, and besides all of these, there is a further reason why the state should make extra efforts to get together a fine display of its

of horticultural products. Making an exhibit to call attention to our wheat fields, our pine forests, our iron mines, our fertile farms, our fine dairy products and our wonderful cities, seems almost a work of supererogation. Who that reads the press of the day has not heard of these things that make the giant state of the great northwest so well known throughout the world; but of its facilities for horticultural pursuits little is known outside our own limits.

The fruit grown here, however superb in quality and abundant in yield is marketed altogether within the state and is absolutely unknown beyond its limits. Even many of our own citizens are altogether ignorant of our striking success in this direction. An intelligent resident of Hennepin county, an old citizen as well, remarked lately in regard to the amount asked for the horticultural exhibit, "What fruit are we growing here any way? We have nothing to exhibit—not ten bushels of apples raised in the state this year." While on that very day Minnesota apples, the Duchess, had overstocked the market and were selling at 50 cents per bushel.

Those whose duties require their attendance on the fruit tables at our state fair have opportunity to note the continuous expressions of surprise and delight at the beautiful fruit on exhibition. "What! Grown in Minnesota! I didn't know we could raise fruit here!" etc., etc.; until in weariness and despair at the never ceasing monotony of endless surprise, the attendants replied mutely by pointing to the sign "This Fruit is Grown in Minnesota." A display in the field of horticulture as broadly covered by the work of our society would include many things which will probably be classed in other exhibits. Sugar and sugar culture, apiculture, forestry, and possibly entomology, ornithology and pantry stores, will probably be found in classes by themselves.

The exhibit in forestry, it is understood, will cover all of the natural forest growths of the state, including not only native trees, vines and shrubs, but also native flowering plants as well.

Cutting out these various classes from our list reduces the horticultural exhibit to a display of fruits, vegetables and cultivated shrubs, vines and flowers. J. M. Samuels, the chief of the horticultural department at the Columbian Exposition, has written requesting that the subject of the horticultural exhibit on that occasion be discussed at this meeting. It is not my intention at this time to go much into detail, but rather to make a few suggestions intended to precede and draw out a discussion, in which it is hoped the best views of the members of our society will be presented.

An exhibit of fruits may consist of fruits shown in glass cans, models of fruit in wax, or fruits exhibited fresh upon the tables during their various seasons and thereafter by preserving them in cold storage. The same plan will apply in the main to an exhibit of vegetables.

An exhibit of cultivated shrubs, trees, vines and flowers would have to be made on a tract of ground set apart for our state, adjoining the horticultural building.

In response to a request from the secretary of the the World's Fair Commission of Minnesota, President Elliot and myself prepared a rough estimate of what might constitute an exhibit of fruits and vegetables, and the probable cost of the same. A brief summary of this estimate in which details are omitted is here presented.

FRUITS.

Shelving to hold 500 glass cans and 1500 plates of fruit. The cans to be filled with specimens of all kinds of fruits. Fresh fruits as follows: Strawberries, 300 plates; raspberries, 300 plates; currants and gooseberries, 100 plates; blackberries, 200 plates; plums, 100 plates; grapes, 500 plates; cranberries, 50 plates; blueberries, etc., 50 plates; apples, 500 plates; crabs and seedling apples, 200 plates; cherries, pears, etc., etc. Wire work for fruit pieces. Total estimate of cost for fruit exhibit, $6,700.

VEGETABLES.

Shelving, same amount as for fruits and; 200 glass cans. Exhibit of fresh vegetables. Total cost of vegetable exhibit estimated at $2,375. Labor and incidentals, $5,925. Total estimate for horticultural exhibit as submitted, $15,000.

This estimate was submitted to the commission with the following explanations, "It is impossible to make anything like an accurate estimate of the expense of this exhibit. It involves an infinite amount of detail to get together from all parts of the state the great number of varieties of fruit and vegetables for canning and for exhibition in a fresh condition during the exposition, all of which means outlay which cannot be counted beforehand with any exactness.

"Still in our judgment this amount will pay the expense for an exhibit that will do us credit and make a satisfactory showing of the really superb quality of fruit and vegetables grown in our state. With strangers there is a general belief that ours is an arctic region, well suited to the growing of wheat and the storing of ice. The display in full variety of our splendid horticultural products, most of which can really be grown upon every farm of the state, is certain to arouse more interest than the display of other very important agricultural products more generally known to be raised, and will exercise a great influence in creating the favorable impression towards Minnesota as a home, which is largely the object sought in making an exhibit on this occasion.

"The money put into this exhibit will be sure to bring large returns and we trust your commission may see fit to give us the opportunity to make a display that Minnesota will not be ashamed to place alongside that of any other state in the north."

On Dec. 30th, at the request of Secretary Reeve, I drew up a formal application for 3,600 sq. ft. of space in the horticultural building, to be used for an exhibit of fruit and vegetables. This was accompanied by a sketch of a possible division of the space, which upon farther study it may seem best to change in part or entirely. The sketch provides for a tract 60 ft. square with walks around the outside, and walks 10 ft. wide through the centre in both directions. It allows for a stand eight ft. in diameter for a fruit piece in the center where the walks cross and in each of the four quarters of the tract as sub-divided, an arrangement of shelving sloping gradually upward from the center so as to show at a glance all our entire exhibit. Arches thrown across the entrances might be inscribed with appropriate mottoes like the one so useful at our state fair "This Fruit was Grown in Minnesota." The details of this outline plan have not yet been worked out.

So far, no space has been applied for outside the horticultural building for an exhibit of shrubs, trees, flowers, etc., and perhaps it may be thought best by the commission not to make such an exhibit.

As far as the disposition of the commission towards a liberal allowance for the horticultural exhibit is known, it appears favorable to the successful carrying out of the wishes of the society. But there are many other interests in the state clamoring for large representations, and it would be well for members of our society, and others interested in horticulture, to seek opportunity to impress upon the board of commissioners the paramount importance of this department.

In getting together the large and comprehensive display desired the cooperation of every member of our society is needed. All parts of the state should be represented in the exhibit, and it should contain every variety of fruit or vegetable that is or can be grown successfully in any part of the state of Minnesota. With your assistance, which is sure to be willingly given, Minnesota may put upon exhibition a display that will be second to none in the country in the kind and classes represented, and that will do much to redeem us from the generally believed charge that ours is not a fruit producing state, and the Horticultural Society of Minnesota may come home from the World's Exposition gaily decorated with the blue ribbons and silver medals that by good right shall be ours.

The paper was listened to with close attention.

Vice-President Wedge: Is there any discussion on this subject?

Mr. Barrett: On my return from Washington, where I had been attending the meeting of the Forestry Association, I went out to Chicago and was introduced by one of the officers of the forestry department to the gentleman in authority at the grounds where the buildings are to be located. They showed me a great deal of courtesy because I was from Minnesota, and as they carried me from point to point, I observed particularly the building that is to be provided for horticulture. There is no building on the grounds that is more beautiful, or more favorably located than the horticultural building. It is charming in every sense of the word. It is a large building and its architecture is superb. Of course, when I came to look it over I asked myself, how will Minnesota be represented? I know the feelings of the friends of horticulture, and I came to the conclusion that we would be well represented, and I am certain that the request of the horticultural society for $15,000 is none too much, under the circumstances. I hope that the proposition of the secretary will be endorsed, so far as the financial part is concerned. One word further. I went around to the various departments, and among them I noticed the forestry department, which is located down by the lake, very near the agricultural building. It is to be very rustic—one of the most attractive buildings in that quarter of the ground. I know what the demand of the forestry association is. It is for $10,000. We give to horticulture the leadership, in respect to the fund,

and it is entitled to it. I think the proposition from the Forestry Association is favorably entertained by the State World's Fair Commissioners. Now let us work together to help these two grand exhibitions of the growth and progress of Minnesota.

The secretary here read a letter from J. M. Samuels, chief of the department of horticulture, Washington:

WORLD'S COLUMBIAN COMMISSION.
OFFICE OF THE DIRECTOR-GENERAL OF THE EXPOSITION.
DEPARTMENT OF HORTICULTURE, J. M. SAMUELS, CHIEF.
CHICAGO, Ill., U. S. A., 19th Jan., 1892.

Mr. A. W. Latham, Secretary Minnesota State Horticultural Society, Owatonna, Minn.

DEAR SIR:—We have sent you to-day a lithograth of the official bird's eye view of the grounds, a few cuts, etc., of the buildings, and some other information that may be of interest to the members of your society, but I regret to say that we are not yet in a position to send you copies of our pamphlet giving classification, general and special rules, etc.; but the questions that are delaying its issue will be settled in a few days, and we will then distribute the information as widely as possible.

The interest being shown in the department is wide spread, and applications for space are being filed by many of the most prominent firms and individuals in the country; and we also expect a representative exhibit from each state interested in horticulture, and what state is not?

Our building is, without exception, the finest ever erected for a horticultural display, and the floor space is larger by many thousand square feet than the combined floor areas of the horticultural buildings at Philadelphia, New Orleans and Paris; the dome is 113 feet high on the inside and the building is planned, in its different parts, to fit the requirements of the different branches included under the heading of horticulture.

We have had assigned to the department about twenty acres on the outside grounds, including all the space available for horticultural purposes on the wooded island, round which all the great buildings are grouped, and which is one of the choicest locations on the grounds.

We are now perfecting plans for planting a large part of this area the coming spring, and consequently we will be very busy for the next few months, and it is imperative that we receive as many applications as possible before spring, our plans depending to a certain extent on the needs of intending exhibitors.

We will commence in a week or ten days to erect temporary greenhouses of considerable size, for bringing plants to their greatest state of perfection before being placed on exhibition, and for storing them after their season of beauty has passed.

Propagating houses and frames will be built, and large numbers of plants will be grown for use on the grounds to be laid out by this department, and for filling out groups that may be deficient.

As it is essential that plans for exhibits be prepared as soon as possible, we hope this question will be well agitated at your meeting, and that all members join heartily in the endeavor to make your display one of the most complete, and one that will be worthy of the great state of which you are a member.

Wishing you a very profitable meeting, I remain, yours respectfully,

J. M. SAMUELS, Chief Department of Horticulture.

Mr. F. G. Gould: I think it would be proper for the society to take some action upon the different branches of that subject. First, upon the question whether this society will endorse the recommendation that that amount be appropriated for this exhibit. I hope that will receive the endorsement of the society; and second, if the society will pass upon the question as to whether the state should make an exhibit of shrubs, or any other exhibit outside of the agricultural building.

Mr. Sampson: I appreciated the secretary's article very much, and I think the amount asked for should be granted. I would further recommend that the state allot the space to the different towns that would take part in the enterprise, giving special attention to their individual exhibits, as being from a particular part of the state. It would create an enthusiasm in enterprising towns to show forth their industries and abilities, and give a greater impulse to the general movement.

Mr. Underwood: This is certainly a subject that we need to take positive action upon, and I think the recommendations that have been read to us, supplemented by the earnest desire of President Elliot that we emphasize this subject, should receive particular attention at the hands of the society. We should do our utmost to secure these privileges which belong to us. The question of out-door decoration has not received enough attention from me to be able to talk intelligently upon that subject. It has not been brought to my notice before. A great deal could be done in that line if we get the appropriation. I think it would be well to act upon the suggestion of Mr. Gould. And I would move that we endorse the secretary's recommendation asking for a grant of $15,000.

Mr. Harris: I think, Mr. President, that that sum would be as small as we could make the proper exhibit of fruit upon. I believe that if we are up and doing, and are pretty thorough in our work, that we can have an exhibit of horticultural products of all kinds, fruits, shrubs and flowers, that will astonish some parts of the world. I think it will be quite a surprise to many people who believe that Minnesota is but one step removed from the north pole. There is a great deal more fruit raised in Minnesota than most persons outside of the horticultural society are aware of. Since the disastrous winter of 1885, there have been a great many thousands of trees planted that promise to come into bearing in time to make their exhibits upon that occasion. I hope that, as a horticultural society, we

will put ourselves together and work shoulder to shoulder for the credit of the society and the fame of the north star state.

Mr. Heideman: I will state for the information of the society that the World's Fair Commissioners are governed by certain restrictions which prohibit them from spending one single cent except in certain well defined ways, and our request should be made that they set aside that amount, or appropriate that amount, for such and such display.

Mr. Gould: In order to get the matter in better shape, I would move that the chair appoint a committee of three to make such recommendations as are thought to be wise and proper, and that this committee report at the evening session. I would further move the committee act upon the appointment of a superintendent of the exhibits at the world's fair, and that the report of the committee be submitted to the meeting for action thereon.

The motion was duly seconded and after a short discussion was carried.

Vice-President Wedge: We will now take up something which we laid aside a little while ago, that is the report of the committee appointed on president's address.

Mr. Thayer: As chairman of the committee, I will submit the following report:

To the Minnesota State Horticultural Society:

Your committee to whom was referred the president's annual address would beg leave to report, that we commend the address entire as a valuable document for all horticulturists and others in our own state.

The question of our production is forcibly stated, and if the remedy suggested can be applied, will result in removing one of the greatest difficulties in the business of fruit growing in our state.

The Columbian Exposition is without doubt one of the most important subjects for our consideration. All the nations of the earth propose to bring their best products almost to our very door for examination, and we in exchange should feel proud to meet them with some of the products representing the immense resources of our great state.

The time is short and now is the time to act.

The organization of local horticultural societies and clubs cannot be too strongly commended. They would be to the state society what the Sunday school is to the church, what the public school is to our colleges, and would be one of the greatest factors in building up horticultural education throughout the entire state.

Forestry, the library and many other topics are certainly worthy of special mention and we trust the address will as a whole be considered worthy of special attention and used accordingly.

Respectfully submitted,

M. A. THAYER,
H. J. LUDLOW,
DEWAIN COOK,
} Committee.

Mr. Harris: I move that we accept and adopt the report of the committee on president's address.

The motion was duly seconded and carried.

Mr. Thayer: I wish at this time to emphasize more strongly one department in your horticultural work. It is the formation of more local societies. I believe that it is one of the most important factors that you have for building up horticultural knowledge in this state. We have adopted this plan in Wisconsin, and we are organizing new societies there all the time. We find it is of very great benefit to us. The horticulturists, in these days, need what every other business needs—that is, organization. The farmer needs it, and the horticulturist needs it.

To show you some of the benefits that could be derived from the organization of local societies, I will give you the following illustrations: Let half a dozen people in the same neighborhood adopt a simple constitution that may be written on a single piece of paper no larger than your hand; have their regular meetings and pursue the subjects as recommended in your president's annual address. In Wisconsin, our society furnishes those short constitutions and by-laws for the government of the local societies. A society of that kind can be organized, and they can subscribe for papers and get all of the reports and form a small library for general use. Another advantage of such an organization, even if there be only ten persons in it, may be found in the making of a purchase for the entire neighborhood. I have in my pocket a price list from an eastern nurseryman, according to which it would cost $52.50 to plant a farmer's garden, as recommended in this illustration of mine, of the best way to plant a quarter of an acre. Now by organization—allowing the secretary of the society to order the plants for the entire ten members, they can get them of any responsible nurseryman or fruit grower in Minnesota for $12, for each garden—a saving in one society of ten members of more than $400. Now that is only one of the benefits to be derived. This is the twenty-fifth anniversary of your society, and it is a good time to start a reform of this kind. I will make you a proposition that looks towards the establishment of your local societies. If this society will adopt some means by which the subject of horticulture can be brought to the attention and put in practice by the young people of the state—by the children of the state, I will promise to donate to the first 1,000 children that can be interested in that way 6,000 strawberry plants from

my grounds, to be given and distributed to the children, gratis, with the understanding that they should care for those plants and do the best they can to cultivate them. I am induced to make this offer for another reason, and that is, that in my own state I was invited on last Arbor Day to address the children of our high school. During the exercises I made the following proposition to them: "I will give to every child that will come to my farm to-morrow morning, either six strawberry plants or two raspberry plants, you to take them with the understanding that you shall set them out at once and cultivate them and make them grow if possible, and learn all you can about them. The next season those of you who make them grow will be entitled to twice as many. I will double the donation to the successful ones." At that time I supposed that perhaps fifteen or twenty would be up there the next morning, but before seven o'clock the following morning the children commenced to come, and before six o'clock that night over 400 pupils from our public schools had been out there and back again—it is over a mile—for those plants.

Well, from that time to this, all through the summer every child that I met would have an expression in their eye, and they would meet me so often and tell how those plants were prospering, and how some of them had died, and others had drooped, and how they had watered them—and probably killed them with kindness—but the expression upon their faces, was wonderfully surprising to me. It suggested to me that if our state societies, by some means, could inaugurate a free distribution of flowers, or evergreens, or a half-dozen strawberry plants, or something of that kind, they would be laying the foundation for horticultural work in this state that would be of immense benefit to you in a few years. I made this same proposition at the meeting of the Northern Iowa Society, and the members immediately said "we will add one thousand to that donation. We will give three or five plants, as the case may be." We raised enough there for about 20,000 plants of that kind. Now, there is no way of distributing these to good advantage except by the organization of your local societies, and I would like to see that started and would be most happy to contribute half a dozen plants to be distributed in that way to each of the first thousand children that can be induced to grow those plants. I have no selfish motive in making this offer, because banking is my business, I am connected with our State Horticultural Society in Wisconsin for glory, and I am

raising berries for my own amusement. (Laughter and applause.) I have issued a little pamphlet on the growing of small fruits that includes a description of this farmer's quarter-acre garden. I will be very happy to send this report to any member of this society, free of charge, on receipt of his address. There is one more thing I wish to say. As president of the Wisconsin Horticultural Society, I extend you a cordial invitation to visit us at Madison. We should cultivate those fraternal feelings more and more, for our interests are almost identical. I have attended your meetings and have enjoyed them very much, and I want you to come and visit us. (Applause.)

Mr. Gould: I move that we tender Mr. Thayer a vote of thanks for his liberal offer to donate to any member of this society that report which he referred to. I know that it must be valuable.

Mr. Harris: I second that motion, and would amend it in this way; that the society adopt it by a rising vote.

The motion was duly carried, and Mr. Thayer was tendered a rising vote of thanks.

Mr. Sampson: I do not want the society to lose the benefit of Mr. Thayer's address. His talk has brought the thought into my mind that the additional fees collected by the organizer would in all probability pay the costs of the organization. I think that we can put an organizer in the field and will make the motion that a committee of three be appointed to select an enterprising organizer who understands the business, and who will push the work. The organizer would organize these local societies, and the members of the local societies would become members of the central society.

Mr. Thayer: We are limited very much in our appropriation in Wisconsin, and so we have not been able to place an independent organizer in the field. We have therefore worked to a great extent, in connection with the farmer's institutes, where we have been granted a portion of the time. You could organize a society in that way with very little expense.

Mr. Wilcox: How many local societies have you?

Mr. Thayer: Sixteen. They send representatives and report to our main society each year, and it is customary for us to pay the expense of the delegate provided they give us a paper on some topic.

Mr. Gould: I move that this matter be referred to the executive committee for final disposition.

The motion was carried.

Mr. Harris: Now that I think of it, I would move that we extend to the delegate from the Northern Iowa Society the usual courtesy that our society has been in the habit of extending, and make him an honorary member for the usual term of five years.

The motion was duly seconded and by vote of the society Mr. J. B. Mitchell, of Cresco, Iowa, was elected an honorary member of the society.

Mr. Wilcox: I understand that Mr. C. H. Hamilton, Ripon, Wis., is a delegate from the Wisconsin Horticultural Society, and I move that we extend the same courtesy to him.

Motion duly seconded and carried.

Prof, Green then submitted the following: "Report of the Superintendent of Central Station, State Experimental Farm, St. Anthony Park." by S. B. Green. (*See index.*)

The following reports were submitted by the superintendents of the substations. "Reports," by Clarence Wedge, Albert Lea; D. E. Myers, St. Cloud; F. H. Fiedler, Fergus Falls; Dewain Cook, Windom; C. W. Sampson, Excelsior; H. M. Lyman, Excelsior; Andrew Peterson, Waconia; O. M. Lord, Minnesota City; C. W. H. Heideman, New Ulm. (*See index.*)

Mr. Harris: I move that this society extend a vote of thanks to the superintendents of these different sub-stations for the valuable work they have done, and for these reports that they have submitted.

Motion was duly seconded and carried.

Mr. Harris: If there is no objection I will now submit my report as a member of the committee on nomenclature and cataloguing. (*See index.*) I will also ask you to adopt these "Rules for naming fruits," which I will read. (*See index.*) We ought to have some guide in finding names for these new fruits, and I move that we adopt these rules which were presented to the American Pomological Association in 1883, and which were most thoroughly discussed, and received their hearty approval. I move their adoption and publication in the transactions.

A lengthy discussion followed this motion, after which the society voted to adopt the same.

An adjournment was taken until 7:30 P. M.

EVENING SESSION, THURSDAY, JANUARY 21.

Vice-President Wedge: Before leaving you this evening I wish to say a word or two. I have had a very pleasant time in

presiding over you, and I wish to thank you for your indulgence. I now introduce to you your president, Mr. J. M. Underwood, of Lake City. (Applause.)

President Underwood: I think if I have reputation for anything, it is as a worker rather than a speaker. You will know better a year from now how you will like me as a presiding officer. I think I may count on your assistance, and without any further remarks, we will proceed with the program.

Mr. Wilcox: I move that we extend the thanks of this society to Vice-President Wedge for the ability with which he has conducted the deliberations of the society.

The motion was seconded and carried by a rising vote.

President Underwood: The society will now give its attention to the reading of a paper by Mr. Cutler.

The following paper was then read, "Lights and Shadows of Horticulture," by M. Cutler, Sumter.

LIGHTS AND SHADOWS OF HORTICULTURE.

M. CUTLER, SUMTER.

Ladies and Gentlemen:

I will begin with the shadows, not shadows general but shadows special, as applied to Minnesota horticulture. When the first settlers came here from their eastern homes, their hopes and desires were to surround themselves with fruits and flowers, and as they beheld the rich virgin soil of these boundless prairies and extensive forests, and saw such fine wild flowers, wild grapes, and occasional patches of wild raspberries, gooseberries, and blackberries, their hearts were filled with hope, "that best boon to mortals given." Scarcely was the virgin soil uprooted ere the apple seed and tree were planted. The eastern tree agent, ever on the outlook for new fields to conquer, heard of this goodly land and hastened to it, where he found the people only too willing to listen to his requests for orders. Quite extensive orchards were set out, several mild seasons followed, and the trees and seeds sown made a good growth. It seemed as though fond hopes would soon be realized. We began to hear reports of farmers bringing apples to market by the wagon load. When suddenly a dark shadow appeared on the horizon. Old Boreas bore down with a heavy hand, so heavy that ordinary thermometers could not tell the weight thereof.

Reports of blight, disease and death in our orchards began to be received and continued to come until fond hopes were crushed, and a great shadow had fallen o'er our land. Again the festive tree agent appeared on the scene, claiming that root-grafting was the principal cause of this great shadow, and if the confiding populace would only buy their budded trees, apples, and even prunes and peaches could be grown in abundance. Hope again beamed from the countenance of many a poor ruralist, to be followed by another shadow, for Albaugh's great budded trees soon gave up the ghost and were food for the flames, while the author of the swindling scheme was made the idol of the tree dealers' craft. We have

known farmers to get the strawberry fever, buy a lot of high priced plants, set them out, and perhaps get one or two good crops; but a shadow came o'er their dreams. The price obained would hardly pay expenses, weeds would grow while they were haying, help would be scarce, and they would soon be in the shade.

With great expectations, some of our horticultural friends have purchased high-priced grape vines, apple trees, etc., only to have a shadow flit across their pathway. You have no doubt heard some big stories of big crops of fruit grown the past season. Our people are enthusiastic, and like to look on the bright side of their profession, but I tell you there is not an old horticulturist in Minnesota but what has had many a shadow flit across his pathway.

We will now change the scene and attempt to discern the beacon lights along the pathway of Minnesota's horticulture during the past twenty-five years. When Peter M. Gideon made a display of that beautiful apple, the Wealthy, and told how he had obtained it, the old veterans like Harris, Stevens, Sias, and others felt like shouting "Eureka! we have now found the pathway along which we shall succeed." This was one of the brilliant lights. Again, I have seen a poor farmer, struggling against poverty, obtain a big crop of berries and get a high price for them, which made the eyes of mother and children glisten with joy, and gave them many comforts that they would have been otherwise deprived of.

Visit brother Latham's vineyard in autumn when the vines are loaded with luscious grapes, or brother Frisselle's currant patch, or friend Busch's greenhouses, filled with fine cucumbers, lettuce, tomatoes, etc., fresh and crisp in the dead of winter, or the greenhouses of friends Mendenhall, Nagel and Gould, and see the beautiful flowers, and then say in your heart if you can, there are no lights along our pathway. To these we may add the great chrisanthemum show, the grand display of fruit at the state fair, and the capture of the grand prizes at New Orleans and Philadelphia. But to the old veterans in this work who are with us to-day the brightest beacons of light have been these annual gatherings, where they have met to compare notes and encourage each other in this good work. When I first attended these annual reunions, it seemed as though the blight had struck the society as well as the apple trees. Scarcely a young man was present, and the burden of their song was: What is blight? How can we stop it? and where did it come from? Brother Harris would get up and, casting a forlorn look over the small audience, express a desire to have some plan devised for getting the young people into our society. But this is all changed now, and these old heroes who have fought so long and valiently begin to reap their reward. Looking into the future, they can safely predict that the day is not far distant when this will be a land of fruit. Long live the memory of those who, in the midst of poverty and privation, blight and destruction, lifted and dispelled the shadows, and once more let in the light of hope and success.

The president then read the following communication and poem from J. T. Grimes, Minneapolis, which was received with much applause:

MINNEAPOLIS, MINN., Dec. 5, 1891.

Mr. A. W. Latham, Secretary Horticultural Society:

MY DEAR SIR: President Elliot requested me to furnish some horticultural literature to present before the meeting of the society at Owatonna this winter.

I love the society, and my heart is with you all; but my age admonishes me that my work is done, and that I should retire from active duties. So, likely, I shall not be able to be with you at that time.

Having nothing new to communicate, either in theory or in practice, I am left with no alternative but to fall back upon the glorious memories of the past. Mr. Elliot assigned me a subject to enlarge upon, but I have not the ability to handle it. I believe it is the common practice with nurserymen, when they have not the stock in hand to fill out an order, to substitute something equally good. It gives me great pleasure to avail myself of this privilege. My little piece is dedicated to the Minnesota State Horticultural Society, and is entitled "Long Ago."

Yours truly, J. T. GRIMES.

LONG AGO.

J. T. GRIMES, MINNEAPOLIS.

In long ago, when Time was young,
Some fanatics, ('twas said or sung)
In horticulture "ganged agee,"
Like 'possums up a 'simmon tree,
With nothing more or less to do,
Than pluck the fruit that nature grew.

Some tree peddlers, with smiling looks,
Came fruitin' round with picture books
And trees to sell—who'd have us know
Just what to plant, and how to grow.
"The good die young," alas! 'tis told;
It was a sell, and we are sold.

Then Harris said 'twould never do
To man our boat with such a crew
Of scalawags of foreign mien;
A fraud! A tramp! A go-between!
We've crabs enough for all our needs,
And Gideon was plantin' seeds.

In long ago, I know it well,
We formed our plans, and thousands tell
Of blessings strewn from door to door,
While we, ourselves, were growing poor,
Without support—but why complain?
We'll meet, and vote to each a cane.

CONCLUSION.

Successes few, and failures by the score.
The isothermal lines could we explore.
And learn the cause of sunscald, blight, disease,
And all the ills that most affect our trees;
From heat or cold, from sunshine, ice or snow,
We know the fact, and yet we do not know.

Who says we're wise? to follow on,—or brave?—
Until our heads have blossomed for the grave,
And we, transplanted to a better clime,
Where Eden blooms in all her pristine prime,
Where every tree shall yield her fruit,—and so,
We all shall meet,—old friends of long ago.

President Underwood: We will now listen to an address entitled "Reminiscences," by ex-President A. W. McKinstry, of Faribault.

REMINISCENCES.

A. W. MC KINSTRY, FARIBAULT.

Mr. President and Members of the Association:

The occurrence of the twenty-fifth anniversary of the organization of this society offers a favorable opportunity for some review of its progress, and especially of matters relating to its early history. Having had the honor of serving as its second president, your secretary has kindly invited me to attend this meeting and read a paper, and very considerately smoothed the way for my acceptance by leaving the subject entirely to my own selection.

As it has been many years since I have been an active participant in its deliberations, during which interval my attention has been mainly engrossed by other and very exacting pursuits, it appears to me that very little that I could say with reference to the necessities and the demands of the present would interest or instruct. But I have thought that perhaps some early recollections concerning the period of my active membership might not prove unacceptable, at least to the older brethren of the fraternity. I do not propose to go into any historical review, but simply to give in a desultory way some fragmentary recollections that the anniversary has suggested to my mind. And first, perhaps, the question will occur to some of my hearers of a practical turn—and most of the Minnesota horticulturists come under that head—how did you, who are neither a nurseryman or a farmer, chance to be selected president of a horticultural society? A proper inquiry which I will proceed to answer to the best of my ability.

My connection with the society dates from October, 1867. The days of my boyhood were passed in a region which has been termed "the garden of New England," being the valley of the Connecticut, in which the proximity of the river, the protection afforded by the bordering hills from winds, and the alluvial soil, rendered the cultivation of the apple, the peach and the pear, as well as of the small fruits, a matter of little difficulty. There were orchards in abundance of grand old apple trees, some of them having been fifty and even seventy-five years in bearing, and there were occasionally farmers who could pride themselves upon being able to enter upon the winter with forty barrels of cider in the cellar. Those of my hearers who remember the music sent forth in the early October morning when the wooden cylinders of the village cider mill first commenced their creaking revolutions, summoning every barefooted urchin to hunt for the best straw and rush to the scene of operations to imbibe the liquid nectar which trickled in ruddy streams from the "cheese" into the receiving tub, will understand how such associations must influence plastic youth in the direction of a love for fruit growing and all that pertains thereto. At the age of sixteen, long before Horace Greeley had thrilled the country with his sage practical advice, "go west, young man," I had acted in the spirit of it and found myself in one of the most favored fruit growing sections of the country, on the south shore of Lake Erie in western New York, a

region so highly adapted to orchard culture that trees had to grow and couldn't help it; one had only to stick a seed in a hole, or push a twig into the ground and nature did the rest. There I achieved a certain degree of success as an amateur horticulturist, growing dwarf pears, peaches, grapes and the smaller fruits, and had come to believe, adopting the timber vernacular, that fruit growing was "just as easy as rolling off a log." I need scarcely add that I have had some reason to revise that opinion since casting my fortunes with the fruit growers of Minnesota.

In the fall of 1865, when I became a permanent resident of this state, the fact that it was comparatively destitute of fruit did not impress me as an insurmountable, or even exceedingly great obstacle. It could not, I reasoned, have been in accordance with the plans of the Creator, to have endowed this glorious land with so many of the gifts that serve to make a people prosperous and happy, and have withheld that one great essential of fruit. A number of other men were of a similar mind, and together we united in March, 1867, in organizing the Faribault Fruit Growers' Club, of which I was elected secretary.

As this club, as I conceive, had a somewhat important bearing upon the fortunes of fruit growing in the state, I shall venture to digress somewhat from the line of review of the state society in referring to its history. Faribault numbered among its inhabitants some of the earliest experimenters in the department of orchard culture in the state. Its original proprietor, Hon. Alexander Faribault, had planted an orchard of fifty trees in 1859 to which he had subsequently made considerable accessions, besides growing several varieties of grapes. I. N. Sater had established a nursery of ten acres of trees. Geo. Dorrance, of East Prairie, had also a successful orchard, and D. W. Humphrey and J. W. Harkness were engaged in the nursery business. Hon. John M. Berry, Judge of the Supreme Court, was also a very enthusiastic amateur fruit grower, whose faith was strong in the ultimate success of efforts to supply the state with home grown apples. With such material for a nucleus it was not difficult to organize a club, of which Hon. R. A. Mott was chosen president. It was thoroughly cosmopolitan, welcoming everybody to membership without respect to residence, color, sex or property qualifications, provided simply that the applicant could tender the modest fee of half a dollar. The club proceeded to cast about for some undertaking that might best fulfill the fruit growers' great aim of benefitting the human race and hit upon the project of adorning the village square with shade trees. This had been once done through a "bee" of the early settlers, but the trees inserted in shallow holes in the sod of the virgin prairie very naturally and unanimously died. To replace them the club proposed to raise funds by means of a strawberry show, and thus early the interests of fruit growing and forestry were linked together in a co-operative movement. The show was fixed for the 4th of July owing to the belief that the largest number of visitors could be secured on that day. The selection of the day, however, came near proving disastrous, for the season was unusually late, and there was a threatening prospect that no strawberries would be ripe. The club, however, with the liberality that usually characterizes men devoted to such a broad humanitarian pursuit, had left competition open to the world, and as the sum of premiums offered amounted to $16, they had hopes that cultivators from more favored regions might come and help

them out. They were not altogether disappointed. Mr. C. R. Hoag had a nursery at Kasson, and despite the protests of some rather ultra advocates of home protection, he was admitted. There were eight exhibitors in all, who presented 26 varieties. Mr. Hoag captured the first premium with seven varieties. It was required that the minimum quantity of any variety competing should be one quart, and that the berries should be turned over to the society. As strawberries were then selling at thirty cents a quart, it will be seen that there was a very liberal drawback to help out on the extremely modest premium list. The ladies decorated the hall and furnished the refreshments, and the show proved a great success. Even the twin cities were represented in the visitors, Gov. Marshall and Hon. John P. Owens, then editor of the *Minnesotian*, having been present from St. Paul, and Hon. Cyrus Aldrich, then postmaster, from Minneapolis.

The net sum of $38.00 was realized, which was invested in plowing the Faribault park and setting a number of trees, of which five evergreens are now living monuments of what is claimed to have been the first strawberry show ever held in Minnesota.

I have been thus minute in detailing the history of the Faribault Fruit Growers' Club for the reason that the organization had an influential bearing upon the early career of the State Horticultural Society. Mr. J. W. Harkness was one of its most useful and active members. He was endowed with those qualities which eminently fit one for pioneer work. He had unconquerable perseverance and an enthusiasm that led him to make little account of obstacles that stood in the way of carrying out his ideas. In his prophetic vision he beheld Minnesota coming to the front in the future as a great fruit growing state, and he consecrated his life to the accomplishment of that result. He was present at the first organization of the State Fruit Growers' Association in Rochester in 1866, and attended the second meeting held during the state fair at the same place the following year. Neither the president or secretary were present, and Vice-President Chas. Hoag, of Minneapolis, presided, with Mr. Harkness as secretary pro tem. He conceived that Faribault, with its active body of organized fruit growers, would furnish a very favorable location for the development of the youthful society, and he planned to have it selected as the next place of meeting. Whether the Twin Cities had not then developed so strongly the propensity with which they are now accredited by some of their country brethren, of "going for everything in sight," or whether, more probably, the infant was so small as not to have attracted their attention, it is not essential now to discuss; suffice it to say, that Mr. Harkness succeeded, and carried with it the election of the writer as president. A more unlooked-for honor is not often bestowed. for I confess that I was scarcely aware of the existence of such an organization. I had no practical experience in fruit growing in the state, although I had considerable enthusiasm, which probably counted for more with my supporters than experience, as with more of the latter qualification I might not have had near as much of the former. It was a sufficiently clear case of the office seeking the man and not the man the office, to have satisfied any advocate of the most advanced ideas of civil service reform.

The selection of Faribault proved every way favorable for the interests of the infant society, for the fruit growers of that section adopted it fondly, and used every effort to strengthen its feeble footsteps.

Of the third annual meeting held in Fireman's Hall in our city, Jan. 30th, 1868, I have the most pleasant recollections. The weather was cold, but there was a warmth of enthusiasm that would have kept the convention in session even though the mercury had been in the bulb. There were no entertainments or side diversions. The members had come together for an earnest purpose, and they attended strictly to business. Minneapolis, Rochester, Winona and Owatonna were represented, and Messrs. Elliot, Mott, Hamilton, Harkness, Jewell, Brand, and Humphrey were among those whom I now recall as active participants in the discussions. One of the important measures adopted at the meeting was the appointment of a committee to act with the State Agricultural Society in securing a fruit exhibition to be held in connection with the state fair. Another was a request to the legislature to make an appropriation to send an agent to northern Europe to secure hardy varieties of fruit trees. That the members, though thoroughly devoted to the purpose of developing the fruit growing interests of Minnesota, were yet quite practical in their conclusions, is shown by the conservatism of their action. After an exhaustive consideration of a great number of varieties of apples, they concluded to recommend but two for general cultivation, viz: Duchess of Oldenburg and Tetofsky, and for sheltered localities and proximity to water a limited list of eight, of which all, I believe, have stood the test of subsequent trials.

In the matter of other fruits the record shows that there was considerable discouragement. One fruit grower resident in Owatonna was quoted in the discussions as having tested eight varieties of grapes and having come to the conclusion that but two could be successfully raised in Minnesota, viz: the Clinton and the Concord.

In 1871 Horace Greeley, whose devotion to agricultural and horticultural pursuits was one of the most prominent characteristics of his eminent career, accepted an invitation to deliver an address at an agricultural fair which was to be held in Minneapolis in September of that year, and was induced to visit Faribault en route and favor our people with his lecture upon "Self Made Men". The next day after the lecture The Tribune philosopher wearing that historic old white overcoat which has become traditionally associated with his appearance in public, was taken in charge by a number of fruit growers and escorted to the farm of the late D. W. Humphery, Esq. to inspect that gentleman's orchard and vineyard.

It was a good season for grapes, and the vines, laden with beautiful clusters of Delawares and Concords, presented an object lesson which it was believed Mr. Greeley, who had been reputed to be a skeptic as to the fruit growing capabilities of Minnesota, could not fail to be impressed with. He saw and was convinced for no one could gainsay such ocular evidence. As he took his seat in the cars for Minneapolis in the afternoon, having both hands filled with clusters of luscious Delawares, of which he partook in mouthfuls as one would eat an apple, his mild benignant countenance glowed with satisfaction, and he discussed Minnesota, its advantages and prospects, with a keen appreciation that delighted the listeners.

Incidentally I would mention, that while in Faribault, Mr. Greeley visited a corn field on the farm of Mr. Humphrey that was of great promise, and pronounced it the best he had seen that year, estimating its product at 75 bushels to the acre. Mr. Humphrey believed that it would reach 120. When harvested, the actual yield was 110 bushels of shelled corn, which has not been surpassed, according to my recollection, by any other field of corn in the state.

The first exhibit at the Minneapolis fair was a surprise, not only to Mr. Greeley, but to most of the visitors from the state at large. Upon a long table in the floral hall was arranged a noble display of apples, including over one hundred seedling varieties, and a large exhibit of small fruits. Stretched over the table was a large banner bearing in bold letters the inscription, "'I should like to live in Minnesota, but for one thing, you can never raise apples.'—Horace Greeley." The philosopher, on seeing the inscription, with the table underneath displaying such a manifest contradiction of his prophetic utterance, declared that he had never made the remark attributed to him. The quotation, however, was vouched for as having occurred in one of Mr. Greeley's speeches in the state in 1865. If he said it, the fact would have constituted no strong impeachment of his sagacity, for at that period the belief was quite general among our own citizens, that Minnesota would always be dependent upon the east for its supply of apples.

The winter meeting of the Horticulturai Association of 1869 was held in St. Paul, at which time the membership had increased from 12 in the preceding year, to 42. At that meeting the spirit of confidence and ambition had so far developed, that a resolution was adopted to collect and send on samples of Minnesota apples for exhibition at the American Institute, in New York. In January, 1871, the association returned to Faribault, its meeting being presided over by that veteran horticulturist, Hon. J. S. Harris. This meeting proved to be very instructive and profitable. A new constitution and by-laws were adopted and action taken toward securing representation in the State Agricultural Society. The horticulturists had reached a point where they felt assured of a firm footing, and the subsequent history of the society has been one of continuous progress on all the lines of development covered by the plan of organization.

A general review of the progress of horticulture in Minnesota in the quarter of the century covered by the existence of the association, shows that though the predictions of some of its very sanguine friends have failed of fulfillment, no question can be raised as to the very substantial benefit that the people of the state have realized from its existence. Its published discussions and its official papers have constituted a great educating influence, preventing costly mistakes and pointing the way to successful effort. The area of apple culture has been enlarged, so that instead of being confined, as in the early day, to the vicinity of bodies of water, sheltered valleys, and tracts of timber, our orchards have been extended over the prairies on which the earlier settlers believed no trees would grow, even to and beyond the western boundaries of the state. Yet it must serve to temper our exultation over victories achieved when we remember, that notwithstanding the enormous increase in the aggregate crop of apples annually grown in the state, there has not been that multiplication of hardy varieties of late keeping, fine flavored, winter

apples, that had been hoped for, and for which our nurserymen have made countless efforts and sacrifices from an early period. The expedient so strongly advocated by many of our early nurserymen of importing hardy varieties from Russia, appears to have been fairly tried, and to have failed of accomplishing the results anticipated. We are still largely dependent for our winter fruit upon the older fruit growing states, and the demand seems to have kept pace with the growth of our population. From a report recently published, I gather that Minneapolis alone furnished a market in 1891 for 196,775 barrels of apples, 446,743 baskets of grapes, and 80,611 cases of strawberries, not to mention the other varieties of small fruits. Never should the fruit growers of Minnesota lay by their armor till the demand for imported fruit has been met by a full supply from our orchards, vineyards and gardens. New varieties will be discovered, and much knowledge gained as to the special adaptation of different localities for different fruits. As an illustration of the change already effected in the ideas of our fruit growers as to the possibilities of fruit cultivation, I recall the fact that Truman M. Smith, who ranked among the early veterans as about the best authority on grape culture in the state, held that grapes could not be profitably grown for less than twenty cents a pound, while D. W. Humphrey, of Faribault, who was accounted a successful fruit grower, at about the same period expressed the opinion that home grown strawberries could not be raised for less than twenty cents a quart. Within the recollection of the writer, the only grapes marketed in the vineyard district on the south shore of Lake Erie were grown by one man in the township of Portland, Chautauqua Co., N. Y., who was accustomed annually to peddle, in the nearest villages, a few bushels of grapes and peaches grown in his nursery. His success finally stimulated his neighbors to effort in the same line. They groped blindly for a time, for there were many false impressions to overcome, the prevailing ideas of grape culture having been drawn from European sources. The scientists recommended the trenching of the soil two feet in depth and filling it with old bones, manure, scraps from the tan yard and any other rubbish that could be made into a compost, involving a very large expense. After many costly failures, the experimenters gathered from the teaching of experience that any land that was sufficiently rich to grow good corn could, with no greater labor in cultivation, be made to produce good grapes, and now a thousand car loads of the choicest Concords, Delawares and Catawbas are annually sent to market from that region at a price that nets the grower from one to three cents a pound, and at which they still regard it the most profitable crop that they can raise.

Looking back at the struggles and sacrifices of the pioneer horticulturists in Minnesota, we cannot but be impressed with their hope, courage and persistent endurance. They had that quality of faith that is said to remove mountains. The farmer loses a field of grain by blight, mildew or drought; he is cast down, but not discouraged, for the crop has involved but the labor of a few months and within another year he may retrieve the disaster. But how is it with the nurseryman? He expends years of labor in nursing his crop of seedlings and root-grafted trees till perhaps they begin to come into bearing, and with assured confidence in the success of his methods he shouts, "Eureka." Then comes a marked change in the season. A winter of exceeding severity, like that of 1884-5,

sweeps away the hopes of years, and the thriving orchards are converted into a wilderness of blackness and desolation. How completely his bark has been wrecked by the evil influences of blight, drought, freezing cold in the winter and alternate freezing and thawing in the spring, is realized only by the old nursery campaigner. Then there is the foreign tree peddler, with his tempting display of pictured specimens, embellished with all the resources of the lithographer's art. Artful in manner, glib of tongue, and profuse in promises, he palms off his stock of unacclimated and tender varieties upon the too credulous farmer, rakes in his shekels or an equivalent in good negotiable paper, and goes his way rejoicing, never to return. Alas for the honest home nurseryman who next travels that way! He reaps the harvest of maledictions that was sown in the dishonest practices of his knavish predecessor. What wonder that the old timers among the Minnesota fruit growers, who have borne the burden and heat of the day, show in their furrowed faces, whitening and scanty locks and stooping shoulders, the effect of the arduous struggles from which they have not yet fairly emerged. But yet there is light ahead, encouraging them to advance with stronger assurance than ever before. There is hope that the Peerless will justify the sanguine anticipations of the propagator and take rank by the side of the Duchess as a hardy tree for all localities, and that improved methods of protection will serve to add largely to the list that can be safely recommended for general cultivation.

As memory recalls the early veterans whose efforts were combined to launch the small bark that bore the pennant of the Minnesota Horticultural Society in its early career—Robertson, Hoag, Stevens, Harris, Harkness, Jewell, Humphrey, Elliot and others whose names appear in the archives of the organization, some of whom are here to-day, while others having "fought the good fight" have passed on to the shining shore, there is awakened a feeling of mingled pleasure and sadness which only brethren who have long stood together in a cause that is endeared to them by recollections of trials endured and victories achieved can realize. When they are gone their memory will be perpetuated in more fitting monuments than can be raised from moulded bronze or sculptured marble, that speak not the language of nature but of art. The trees of the orchards they have planted on hillside and valley, decked in the spring with leafy verdure and crowned in the autumn with golden fruit, the noble groves adorning and beautifying the grounds of many a mansion and affording shelter to choirs of feathered songsters whose music fills the air, the trim hedge rows and beautiful borders of garden flowers which at once charm the eye with their beauty and delight the senses with their sweet perfumes, each in its appropriate sphere will bear testimony to the lofty enthusiasm, the sturdy endurance, the unconquerable energy and the broad humanity of the men whose love of nature has ever prompted them to more intimate communion through the medium of tree, bird and flower.

On motion a vote of thanks was tendered to Ex-President McKinstry for his very interesting paper.

The secretary then read the following letter from Col. D. A. Robertson, of St. Paul, the first president of the Horticultural Society.

ST. PAUL, MINN., Dec. 9, 1891.

A. W. Latham, Esquire, Secretary of the Horticultural Society of Minnesota.

DEAR SIR: I regret very much that I cannot attend the meeting on the nineteenth prox. at Owatonna. It certainly would be a great pleasure to me to meet you all, and talk over the history of the society, and its good work in the past and present, but I dare not expose myself to severe cold, nor leave home this wintry weather. I hope you may have a large and enthusiastic attendance and will read with great interest the account of your proceedings in our daily journals.

The admonitions of failing physical health warn me not to add any other labor to the attention required by private affairs.

Yours truly,

D. A. ROBERTSON.

The secretary then read the following communications from A. W. Sias, Pueblo, Colorado, and Truman M. Smith, San Diego, Cal., both of which were received with much applause:

COMMUNICATION.

FROM A. W. SIAS.

PUEBLO, COLO., Jan. 1892.

Mr. President, Ladies and Gentlemen:

By invitation from your honorable secretary we now take a hasty retrospective view of your work for the quarto-centennial session. Had your stray member been in Minnesota at the time your program was made up he would have made a strong effort to head off Owatonna and urged you all to return to your "old home at Rochester" to celebrate your twenty-fifth anniversary. The good people of Owatonna know just how to handle such honored guests—and Brother Dartt *especially* will make you feel that there is no juice of the apple, pear, plum or grape too good for you—he is "built that way"—like *prohibitionists* generally.

Twenty-five years ago last October at the city of Rochester, (as the novelist would say—of respectable parents) this society was born, Col. D. A. Robertson of St. Paul—the eminent scientific horticulturist—said to be its father. Who the noble mother was we have never been able to ascertain. Some wag suggested that the mother was probably absent when the child was born or there would have been an official record kept of the members, and their work for 1866. John S. Harris officiated as godfather and proved himself faithful to the trust.

Historians have frequently been terribly nonplussed in compiling works of great public interest where carelessness had prevailed for a number of years, in regard to *names and dates*. If any member doubts this assertion he will oblige me by asking I. Donnelly to give the *exact* name of Wm. Shakspeare and the *exact* date of his birth. And to come a little nearer home, please ask the compiler of our first report (in book form) dated 1873, to give the official report of the transactions of this society for 1866. This child of horticulture was educated mostly at Minneapolis, under the fostering care and tutorship of Prof. Elliot. The Professor like the late P. T. Barnum is ever in search of big shows, big conventions etc., etc. This public-spirited trait, so liberally indulged in, paved the way, if it is not the direct cause, why Minneapolis succeeded in capturing the great Re-

publican convention to be held this season for the nomination of a president of the United States. In taking a retrospective view of the society's work, I'm forced to the conclusion that Col. Robertson (or we might say his prophetic theories as given to us in 1866) deserves more than a passing notice. He said it was "the *rays of the sun* that does the mischief to our fruit trees," and backed up the assertion with a scientific discourse that was unanswerable. The Colonel was president of this society for 1866 and 1867 and I remember that he spent a large share of his time while in convention trying to impress the fact upon us that we should look to Russia for hardy fruit trees adapted to our peculiar climatic conditions.

The best orchards in Minnesota at the present day are those that contain the greater number of Russian varieties. And these same varieties in Colorado—six thousand feet above sea level—are still more successful than in Minnesota. The extreme heat is not so great in Colorado as in Minnesota, but we have *more of it*, and if a tree happens to have a thick leaf, like our native cactus that thrives so well on the arid plains, we shall not reject it on that account. We know what sun scald means here, and prefer the bush form for fruit trees. After what I have said in favor of the Russians, do not suppose me so "aggrieved and pugnacious" that I can see no good in other species.

I will now ask a few questions, and you can do as you please about answering. Was it not the agitation of a *good cause* by the first president of this society twenty-five years ago that resulted in the scattering of almost numberless varieties of Russian trees, shrubs, and choice fruits all over the United States and Canada? Was it not Peter M. Gideon, the Dr. Van Mons of Lake Minnetonka, who did "sow, resow and sow *perpetually*," till his good works were as apparent in the great southwest as at his home in the northwest? Was it not A. W. Latham, John S. Harris and a few other well known "vine dressers" of Minnesota who took three prizes out of the five offered at the World's Fair at New Orleans? Did not Oliver Gibbs, Jr., bring you a Wilder medal from the great Centennial Exhibition at Philadelphia? Did not John S. Harris obtain for the society another Wilder medal from the American Pomological Society at their last meeting at Washington, D. C.? Is not C. W. Gordon, of Long Lake, the Minnesota champion of the dwarf or bush form for fruit orchards, as practiced on the great steppes of Russia so successfully? We believe Mr. Gordon has struck the cheapest and best way of guarding his trees against sun scald, that ruins so large a per cent of trees headed in the old eastern style, so catch on to his bark and he will run you safe into port. Messrs. Barrett and Harris are making praiseworthy efforts to resurrect the Forestry Association. What move could be more important to the state? What did Minnesota know about twelve story blocks with elevators leading to flower gardens at the top twenty-five years ago?

Before leaving Minnesota we got up a small collection of cabinet photographs of some of the leading horticulturists of the northwest, among which is the modest looking face of Ex-Pres. R. J. Mendenhall, of Minneapolis. Mr. M. represents the aesthetic side of horticulture, and we are always reminded of flowers when we look upon his face. The culture and discussion of flowers has been too much neglected in our society.

This society will without doubt celebrate its semi-centennial in 1917—but as it is extremely doubtful about my being present or even furnishing a paper—you will please to excuse me for being so *tiresome* on the present occasion. The first official list of paying members was made over to this society in 1867 by J. K. Kepner, and consisted of twelve members. Eight of these have passed over the "dark river." Three have either left the state or the society, and the only working member now left in the state is John S. Harris. Mr. Harris is such a persistent, hard working old soldier in this good cause—always at the post of duty—that we would not like to think of his being anywhere else, during your annual and semi-centennial meeting in 1917, except right here with you and ready for business. Owing to the fact that I happened to be one of the original members of this society I have consented to give a rough birds-eye view of some of the old members, and not wishing to occupy too much of your valuable time, have failed to mention some of the very best of them. What I have said may look to some of you as uncalled for, but I have not gone beyond the facts, and when we know that a member has made himself, by hard work and self sacrifice, a worthy example for others to follow, why wait for him to die before we admit it? Twenty-five years' experience with horticultural work has demonstrated the fact that a society to be successful for any length of time must have aid from the state. So, as the late L. B. Hodges would say, you must keep "stirring up the whole legislative menagerie," till that honorable body takes due cognizance of your just appeal, and honors you and themselves with an appropriation large enough to establish a good horticultural society in every county in Minnesota.

I was very much interested and instructed in reading the able paper by Dr. Jas. R. Walker, in report of '91, on the "Wild Fruits Native in Northern Minnesota." This and Col. J. H. Stevens' "Wild Food," in book '88 and S. M. Owen's "Forests and Mines," in the same number, will bear close inspection.

Many have taken it for granted, without proper investigation, that the northern portion of Minnesota was too cold for successful fruit culture, but Dr. Walker gives satisfactory evidence to the contrary. What he designates as the "Itasca region," he says is "nearly one-fourth water." I have always been known as a crank on Minnesota fruit growing, and the principal thing on which the strong "faith within me" was based was the fact that Minnesota has within her borders *numberless lakes*, hence doubtless better watered than any other state in the Union. Trees, shrubs and fruits are composed mostly of *water*, and cannot be run *successfully* without a most liberal supply of this common fluid. Water keeps off the frost, as the doctor says, a month later in the Itasca region than at St. Vincent or Moorhead. You can't emphasize that little word *water* too much! With a judicious use of water Colorado gives a higher average yield of wheat per acre for 1891 than any other state. (*See Ag. Dept. Rep.*) I notice the doctor failed to find the wild crab in northern Minnesota, but as it is plentiful in the southern part of the state, why should it not prove, when ameliorated, the best species for that cold climate?

We have no desire to close these disjointed reminiscences of our society's grand achievements in horticulture, 'till we acknowledge our indebted-

ness to the many noble women who have contributed so much to help along in this good work—without which it would be lacking much of its present artistical importance. Among the honorary life members, we notice with pride such names as Mrs. C. O. Van Cleve, of Minneapolis, Mrs. Wm. Paist, Hersey, Mrs. H. B. Sargeant, Lake City, Mrs. Ida E. Tilson, West Salem, Wis., Mrs. J. W. Manning, Boston, Mass., Mrs. Wealthy Gideon, Excelsior, Mrs. Jas. Bowen, Minneapolis, Miss Sarah M. Manning, Lake City. Aside from the above list, Mrs. Anna B. Underwood, Hortense Share, and many other noble women, have done much to enliven our columns, and we hope it will not be long before the disgrace of *disfranchisement* will be lifted from woman, so she will not be obliged to help pay for *old and expensive liquors* on the table of the White House—"*without representation.*"

Censure is sometimes more useful than praise, and I wish to blame this society for treating our *wild native crab* with such cool indifference. If Europe, as we are told, took her little wild native bitter crab (smaller than ours) and produced the Ribston Pippin, of which Downing said it "stands as high in Great Britain as the Bank of England." Then is it not *reasonable* to suppose, before you celebrate your semi-centennial, that some Dr. Van Mons, or Thos. A. Knight will produce an apple as good as the pippin from our native crab? *Possibly*, some wise man may inform you that certain species *already ameliorated*, are as hardy as the Minnesota type of wild crab. Do not believe it 'till fairly tested and *proven.*

Just a few words to the young men of the society, who are soon to step into the places made vacant by the old pioneers, and I am done. Carl Von Linne, (*Linnæus*) father of modern botany, was born of poor parents in Sweden, May 12, 1707. We are told that he was apprenticed to a shoe maker; that he suffered much from hunger and cold; but finally, through hard work and hard study, became the foremost botanist of his time. Now this reminds me of another young man who came into Olmstead Co., Minnesota, quite a number of years ago, from that same section of country, (as I have been told,) where the great botanist was born. I am not able to say whether this young man is the greatest botanist in Minnesota, or not, but I *do* believe that as an orchardist, he has few, if any, superiors in the state. This was accomplished by many years of hard work and faithful service as foreman on a fruit plantation of which he subsequently became the owner. I refer to a gentleman who needs no introduction, R. C. Keel. I mention these two cases for the encouragement of young men in Minnesota who think there is no chance to *work up* in horticulture in so cold a climate. Hard, *persistent work*, intelligently applied, will bring success. Now let me again give you a formula for an orchard, that if closely adhered to, will beat the old pioneers clear out of sight. 1st, use ten times more water in seasons of drought than they did. 2nd, prepare your land for the orchard by plowing in clover, and remember that clover is the best plant to bring nitrogen from the atmosphere, (the best element of plant food.) Study hard to beat the old gents on the orchard's environment. Make it the paradise for the pigs, fowls, birds and bees. These are all indispensible in a no. one orchard. If possible, plant ten acres of nut, berry and honey producing plants, on the west and southwest of the orchard. Sow a good, wide space between orchard and wood to white clover, for the bees, and to give free circulation of air to prevent blight.

Buy your trees of honest men and head them low. After your orchard begins to fruit, *trust in clover, hogs and ashes.* A. W. SIAS.

LETTER FROM TRUMAN M. SMITM.

SAN DIEGO, CAL., January 7, 1892.

A. W. Latham, Excelsior, Minnesota:

DEAR SIR: Your kind and much appreciated letter inviting me to be present at your twenty-fifth annual meeting, from the 19-22 inst., came duly to hand. I would be more than glad to be present and meet once more not only the old friends and fellow workers in building up the State Horticultural Society, but the pioneers and friends and pillars of the great state of Minnesota. For thirty-six full years I was a resident of Minnesota, and it was there in the prime of my life that I worked with a will for the advancement of my adopted and beloved state. I still hold an interest there, my children all being there, and I can most sincerely assure you that I still have a live interest in the welfare of Minnesota and in the Horticultural Society.

Nothing would gratify me more than to meet my old associates, and the members of the Horticultural Society. But I suppose that while I am forgotton by most, I am remembered by some, especially among the older members. I have read accounts of your transactions with much interest, and now have nearly all the copies of your reports from the commencement of their publication.

I would suggest as topics for discussion, "Irrigation of Fruits." I think you would receive great benefit from good systems of irrigation, so they could be applied when necessary. "The Importance of Interesting the Young of both Sexes," is another topic worth discussing.

Now it may interest some old members to hear from me and to know that I am still working away at horticulture, still trying to grow fruit, flowers, etc. I am determined not to rust out if I wear out. I would be so glad to meet you all, but circumstances beyond my control make it impossible at this time. I hope at some future time to meet you at your summer meeting, if I live and succeed, as I hope, in getting water for irrigation. I have lost this year fully $1,000 for want of sufficient water. Water is king here, and I hope to have plenty after this. I have 15$\frac{1}{10}$ acres in the city 2$\frac{1}{2}$ miles from the court house and postoffice, and about the same distance from National City.

I am now growing 700 orange trees, some of which are twenty feet high, 165 lemons, some very large and full of lemons, guavas, pomegranates, figs, apples, apricots, peaches, nectarines, plums, limes, grapes, mulberries, and other fruits, besides flowers. To-day I have finished putting in a little over three acres of wheat, for play. While we can raise almost every kind of fruit grown in temperate and semi-tropical countries, we have to work for it even here, for we must irrigate and spray for scale. Eternal vigilence is the price of fine fruit everywhere.

This winter, December 7, 8, 24, 25 and 29, we not only had frost but ice was formed, the thermometer being down to 28 degrees, or four below freezing. It of course injured all tender flowers and young tender shoots of oranges, lemons, limes, etc. In some low places fruit was frozen on the trees. I have marketed my fruit myself and oversee all, and it has

been more than I was really able to do; but help is high and usually poor, and I have been compelled to do all I could to keep out of debt;—but I owe no man in California.

We have the very finest climate in the world to live in and I would not change it for any other. This makes six winters I have been here, and this has been the coldest. Twenty-eight is the lowest I have found my thermometer at daylight, and it has been from forty-two to fifty-two at daylight, and from sixty-four to seventy-four at noon, the last few days. I wish you all a good time and more success in the next twenty-five years. When any or all of you come to California, you must call to see me; I shall be glad to meet you, one and all, and will do the best I can for your pleasure and profit. TRUMAN M. SMITH.

Secretary Latham: I wish to speak at this time about this fruit, which has been sent to us by Ex-President, Truman M. Smith.

The secretary then exhibited and explained the varieties of fruit, the gift of Mr. Smith.

Prof. Green: I move that we tender a vote of thanks to Mr. Truman M. Smith for the interest he has taken in the society, and for his kindness in sending this fruit.

The motion was duly seconded and carried by a rising vote.

Mr. Gould: While I lay no claim to the rank and standing of an old member of the society, I will trespass upon your time for a few minutes. I move that we tender a vote of thanks to Brother Dartt and the citizens of Owatonna for the generous and hospitable manner in which we have been entertained. I make this motion because I do not expect to be here when the final resolutions are passed, yet I want to share in that vote. Therefore, I make the motion at this time.

The motion was duly seconded and carried.

Mr. Harris then read the following paper: "A Review of Horticulture in Minnesota", by J. S. Harris, La Crescent.

REVIEW OF HORTICULTURE IN MINNESOTA.

JOHN S. HARRIS, LA CRESCENT.

Horticulture in its fullest sense embraces pomology, flower culture, arbor culture and gardening of every type and kind. I shall upon this occasion confine myself chiefly to pomology or that branch which relates to fruit growing.

Of the horticulture of Minnesota previous to the organization of this society but very little is known. The pioneer settlers of this state were largely the most energetic, enterprising and intelligent young men of the New England and Middle states, and of other lands; generally men of limited means but refined tastes, who came to the then wilderness to carve out homes and surround themselves with the necessities, luxuries and refinements of civilized life. They came in advance of the railroad and telegraph, making long journeys in canvas covered wagons, contain-

ing the wife and little ones and often all of their worldly effects, with but very little money; enduring hardships, trials and disarrangements, which they bore with a heroism and fortitude that should command the admiration of the world. Their first work was to erect shelters for their families, and to put in grain and vegetables to furnish food for their future use. This done, they commenced hewing out and fashioning a home after a pattern of the home of their childhood which was photographed in their hearts. The "ideal home" was surrounded with trees that budded, bloomed and yielded up their fruits to its occupants, and the new home would never be complete without its orchards and gardens of trees, plants and vines. And now commenced the difficulties. Many of them had brought along seeds, but they had been saved from favorite varieties whose vitality had been greatly impaired through long propagature by modern methods, or had their origin in a climate differing very materially from this, and they had to plant them in the virgin untamed soil that prolonged their annual growth into the verge of winter, and year after year they would be killed back to the snow line. Many procured and planted trees from the nearest available nurseries which, were far away, and the means of transportation so slow, that much of the stock was dead or barely alive before it reached its destination, and such as lived made a feeble growth and were of varieties that required a long season to mature their growth and get ready for winter, so that rarely any of them ever survived the third year. Then, unfortunately, "croakers" raised the cry that Minnesota was not nor ever would be a fruit state, so that at one time it seemed as if the oily tongued tree peddler could invent no new lies to beguile the unwary, and he would have to put up his plate book, fold his tent and depart for other shores.

Still, there were among these early settlers a few would-be pomologists who had determined to grapple with this most difficult problem that ever had confronted man in any land or age of the world. Their watchword was, "Onward!" They had nailed their flag to the mast, and surrender they would never. It is a pity that their names have not been written in letters of living light, or deeply engraved on monuments more enduring than granite, and the story of their persistency, self-sacrifice and heroism written on imperishable tablets, to be read by those generations who shall occupy the land when Minnesota shall be acknowledged the best apple country on the whole earth; for such it will be, if the spirit of the fathers is inherited by the sons.

As before hinted, of the earliest efforts at fruit growing in this region but few have been recorded. About all we know of the efforts put forth previous to the occurrence of the events that led to the organization of this society, is, that a few men, strangers to each other, and in different parts of the state, did plant and re-plant trees, and struggle against great odds, for many years—with trials great but triumphs few. Among the earliest was L. M. Ford, who started the growing of trees by planting seeds at Groveland between Minneapolis and St. Paul, in 1850, and at that time, or soon after, began selling trees that he had imported from Iowa, Illinois and New York. These trees seemed to do very well, until the winter of 1855-56, when a large portion of them were killed to the snow line, and others received a shock from which they never fully recovered.

This calamity caused him to turn his attention to the Siberians and crabs, and he never afterwards expressed very strong faith in apples.

In the spring of 1852, John Shaw, from the state of Maine, established a settlement at Minnesota City, in Winona county, and caused to be planted a nail keg full of apple seeds that his neighbors of the eastern home had saved for him. Those trees were distributed among the farmers of that county. A great many of them survived for more than thirty years, and formed the starting point of a number of orchards that at one time had great promise. Trees from Rochester, N. Y., were sold and planted in that county quite extensively a year or two later.

In the spring of 1853, Samuel McPhail, one of the earliest settlers of Houston county, planted a few trees and started a nursery at Caledonia. The same year or the year following a few trees were planted at Brownsville, and occasionally a tree of these early plantings escaped death in the memorable winter of 1856-7, and yielded fruit for many years. About 1854, a nursery was started at La Crescent, but never amounted to very much owing to the fact that the proprietors were non-residents, and in the course of four or five years the project was abandoned and the trees left to the tender mercies of mice and rabbits. About this same time, 1854, Peter M. Gideon began the planting of trees quite extensively at Excelsior, in Hennepin county, meeting with heavy losses; also at the same time planting a bushel of apple seeds, a peck of peach pits, etc. If we remember right, but one of the seedling apple trees survived long enough to produce any fruit and that of very inferior quality. The seeds of that lot had been saved from fruit grown in more southern latitudes, and the failure led him to try seeds produced in the state of Maine, trying both apple and crab. The result of this experiment was more satisfactory, as it resulted in the origin of the famous Wealthy, which stands next in value to the Oldenburg for severe climates. About this same date, Jacob Klein, Wm. H. Dunbar, of Houston county, and others started seedling nurseries and planted trees, that afterwards developed into promising orchards that endured and fruited for many years, but to-day there is not a vestige of this promise left except one tree, the Catherine of Jacob Klein, grown from an ungrafted variety in Canada. Between 1855 and 1860 numerous agents, representing Rochester, N Y., Rockford, Ill., and other points, began to find their way across the father of waters and considerable quantities of trees were sold and planted in the older settled portions of the state. Unfortunately the selections made were largely Baldwins, Greenings, Rambos, and such popular varieties, and but few of the trees survived long enough to show that they were true to name; but at this early date, 1860, we hear of some crab apples and pears having fruited.

The first purely horticultural meeting of which we can find any record, was held in the capitol at St. Paul, not far from the first of February, 1860, under the auspices of the Agricultural and Mechanical Club of the legislature, with the president, our Col. John H. Stevens in the chair. Were the legislature of the present day composed of such men, both agriculture and horticulture would be far in advance of what it now is, and we should not be found trembling in our boots every time they are in session, lest there shall be a majority of imbeciles there who would wrest from us the little pittance we now receive from the state to help carry on

our work. Three of these meetings were held; the first devoted chiefly to the apple; the second to small fruits; the third, fruit raising in general. Of those who participated in these meetings, Col. Stevens, L. M. Ford and O. P. Whitcumb afterward became members of this society. Col. D. A. Robertson, Levi Nutting, and one or two other of our early members belonged to that club and doubtless were present at the meetings. At the first meeting the following resolution was passed:

Resolved, That it is the opinion of this meeting, that with proper care the cultivation of apples and pears may be successfully carried on in this state.

The first horticultural literature published in the state was, necessarily, chiefly selections from eastern writers, or the writings of men but recently on from the east, and hence was a very unreliable guide in our peculiar circumstances. That I very frankly acknowledge to be the case with the series of articles that I furnished for publication in those early days. L. M. Ford published the "Farmer and Gardener" as early as ....., and the "St. Paul Pioneer" frequently contained some item on fruit culture. During all these years pomology was slowly and surely, but almost imperceptably, gaining ground in spite of all losses, mistakes and disappointments, but at a fearful cost of time and money in experiments conducted by men whose financial circumstances hardly warranted the sacrifice. It is not likely that the bulk of fruit produced previous to 1860 amounted to any considerable quantity. From the record of the meetings held in the capitol that winter we learn that Mr. Thurber, of Cottage Grove, had planted seed and in six years had pies made from the apples grown on them; and Mr. Pond, of Oak Grove, had successfully raised apple trees that bore fruit year after year. About the same time some Flemish Beauty pears were produced by Mr. Ford and Mr. Huff, of Winona, and we also heard that some of the common and larger Siberian crabs had fruited. The first display of fruits made at state fairs, that we have any account of, was made at Fort Snelling in 1860, when premiums were awarded for a few crab apples, and for grapes and strawberries.

The first display of grafted fruit grown in Minnesota, that we have any account of, was made at Rochester, in 1866, by I. W. Rollins and myself, Mr. Rollins showing about seven or eight varieties and myself about eighteen, and also a collection of grapes comprising six varieties. I was somewhat green, but managed to carry off the magnanimous prize of five dollars for the greatest number of choice varieties named and labeled grown by the exhibitor, and Mr. Rollins was awarded the second prize, which amounted to three dollars. Both of us were eligible to have competed in class two, but did not know it until it was too late to make entries, so that prize was given to Mr, Hurd, of Rochester, on a barrel of fruit containing two or three varieties of apples sent up from Whitewater, Wisconsin. You can rest assured that that was the last time your humble servant got caught in that manner, and for a few following years we filled all entries in both classes without ever getting left on first prizes.

Some time towards spring of the year 1866, there appeared in the *Pioneer* a request from Col. D. A. Robertson of St. Paul for information from those who had attempted to raise apples in the state, and the reports made were soon after published in that paper, and Mr. Robertson was at once recognized as our pomological leader. These papers and the unexpected exhibit of apples made at that fair without doubt brought about

the organization of the "Minnesota Fruit Growers Association," since christened the "Minnesota State Horticulticural Society." Since the organization of this society twenty-five annual state fairs have been held, exhibitors have multiplied, and at many of the fairs plates of apples have been shown by hundreds, and the little eight dollars offered at that fair has been increased to as many hundreds; and notwithstanding the calamity that overtook us in the winter of 1872-73, destroying trees by hundreds and thousands from root killing, and the worse disaster of 1884-85, that totally annihilated many varieties, the car of pomology is being pushed steadily along, The advance in other branches of horticulture has been truly wonderful. Grape culture has proved a grand success; our strawberries, raspberries, currants and blackberries lead in the markets, floriculture has grown to enormous proportions, and vegetable gardening has more than kept pace with the increase of population

We will now turn our attention for a moment to this society. I have been accused times without number of entertaining impractical ideas on Minnesota pomology. I admit that I now and always have indulged in rose-colored anticipations in regard to the future of apple culture in Minnesota and to-day, I am more firmly than ever grounded in the faith. that the predictions I have made will come to pass,and I confidently look to Professor Green and the scores of intelligent members of this society, who are to follow me, to help bring them to pass quickly. I admit that when the spring of 1883 with its warm rains and life-growing suns failed to bring forth leaves and blossoms on our apple trees, I trembled a little in my boots lest all men should call me a liar; but I investigated the cause and planted more trees; and then, when the spring of 1885 opened and the fruit trees were blackened and dead with only here and there an exception, and I saw in the newspapers of the north-west paragraphs like this: "Reports from middle Iowa say many apple orchards are killed by the severe winter. One farmer reports a loss 55,000 trees seventeen years old," I felt a chilly sensation, but I planted more trees.

To look ahead a quarter of a century seems afar off, but how short seems the one past to the battle-scarred veterans who have stood by this society from the beginning. Have we made any advance as a society? We certainly have, and that, too, against such odds as never confronted the people of any other state or country. Our society was organized at a time when the popular opinion and public sentiment was against us; at a time when it seemed as if the majority of the people had determined that fruit, or at least the apple, should not grow here. The organization formed at Rochester twenty-five years ago was a small one, only twelve members all told. A child was born. A wholesome diet of fruit and good nursing saved its life. It got safely through the measles and whooping cough,and by the aid of a little state pap, which was grudgingly given, to-day it is a rugged youth that can neither be frozen or starved to death. Our membership is now nearly two hundred and fifty, and we wield an influence that is felt in every part of the state. Through its influence homes have been adorned, and the inmates made healthier and happier; shade trees and lawns, orchards and gardens surround thousands of happy homes, and hundreds and thousands of dollars are annually saved to our state on the home-grown fruits that are consumed. Two hundred and fifty members at the end of twenty-five years is perhaps as good as some

of our neighbors can boast, but I believe that with a little effort on the part of every present member, we could come up to the next annual meeting one thousand strong. Only just think of it; a dozen men set the car in motion! The track before us is smooth and the grade level, and over two hundred wide-awake men are pushing it onward, and a thousand more stand ready to fall in and help as soon as invited. Yes, gentlemen, the day of our hopes is dawning! The rosy light is now streaking the eastern horizon, and victory shall be perched on our banners.

President Underwood: I will call on Mr. Ditus Day, as one of the old members of this society, to give us a few remarks.

Mr. Day: Mr. Chairman, I have been very much interested in the papers and discussions that followed them, during the time that I have been here. I am not much of a talker, but a very good listener, so I will just make a bow and sit down. (Applause.)

President Underwood: We will call upon Mr. O. F. Brand.

Mr. Brand: I will say with Mr. Day that I have been very much interested in the many instructive papers that I have heard read here. I have not prepared any speech for to-night, and, as there are no doubt many other members whom the society would be glad to listen to, I trust that I shall be excused. (Applause)

President Underwood: I am sure we would like to hear a few remarks from Mr. J. P. Andrews.

Mr. Andrews: I am not one of the old members of the society, and therefore do not feel like trespassing upon the time of the society when there are so many of the old members present, from whom we would all be very glad to hear. I can only say that the society has my best wishes for long continued prosperity. It is doing a noble work. (Applause.)

President Underwood: Notwithstanding your statement to the contrary, Mr. Andrews, I find your name on the record as one of the old members.

Mr. Harris: You may depend upon it, Mr. Andrews is one of the old members, and we will have it understood, despite his modesty. (Applause.)

Mr. Harris: I want to say something right here. I have a copy of the first transactions of the society that were ever published; also a copy of the transactions of the horticultural meetings held in St. Paul in 1859 and 1860, and a copy of the premium list of the state fair of 1867, all of which I will present to the society. (Applause.)

President Underwood: A speech from Mr. Chas. D. McKillip, Faribault, will be very acceptable at this time.

Mr. McKillip: I do not consider myself one of the old members of the society, and so I did not expect to be called upon to say anything. But there is one thing that I will say in reference to apple raising. I do not know that I ever saw it mentioned in the proceedings of any society. When I taught school in 1864, I was told of a man by the name of Stevens who had an orchard and raised some fruit. In the fall of 1864, when I was going along the road to Fort Snelling with a party of friends, we noticed what appeared to be some apples growing on trees there, and those trees seemed to be pretty large. Now, I am aware that this is a Grand Army hall, and being an old soldier myself I will be very careful what I say as all old soldiers always are. (Laughter.) But I will call upon Mr. Day, who is in my neighborhood, to say whether or not there was a man by the name of Stevens raising apples in that country in 1864.

Mr. Day: Yes, Mr. Stevens did raise apples before '64. I also raised apples myself about the same time, but the trees have now passed away.

Mr. Harris: There were a number of apples raised, but not shown at the State Fair, previous to 1866. In 1860 there were pears, etc., raised. The first apples I had on my place were in 1860, and I believe there were a few raised before that.

President Underwood: We would like to hear a few words from Mr. C. L. Smith.

Mr. Smith: I will say that the first horticultural society that I ever joined and paid my dollar for membership in was the Minnesota State Fruit Growers Association, at Rochester, in 1866. The next year I met with them under the steps of the amphitheatre. That year I made an exhibit of fruit and among other things was awarded a premium of eight dollars on grapes, that I have never received. (Laughter).

Mr. Harris: And it is very likely that you never will. (Laughter).

Mr. Smith: I went west then, out on the prairies in Faribault county. There were a few trees at the east end of the lake but none in sight at the west. I began tree planting on the prairie, but a good frost winter-killed them. I came down to Albert Lea and there I made another venture—another mark. The mark is there yet, and it is one that I am not ashamed of. Then failing health and business matters led me to go further north and I went to the city of Faribault and made a little mark there. I could see some of that mark as I came down on the train yes-

terday. The trees are there, still growing. From there I went to Minneapolis, and I have been dabbling in trees since I went there, sometimes successfully and sometimes unsuccessfully. As Mr. Cutler said in his paper, there have been shadows as well as sunshine. I want to say to-night, that as I look back over the work that I have done, the pleasantest recollection that I have of that work is the fact that I believe that there are many boys and girls in the state of Minnesota who can say they have enjoyed luscious berries and delicious fruit because of the talks I have had with their parents, trying to induce them to plant fruits and berries, and telling them how to do it. In '66 and '67 I was one of those despised creatures, a tree agent. I tramped on foot all over the hills and prairies of Wabasha county in 1866, inducing the farmers, wherever I could, to buy the Hyslop crab apple, Doolittle raspberries and Red Dutch currants. Some of those crab apple trees are bearing yet. In the winter of 1866, I obtained some scions from a man by the name of Benedict, in Wabasha, and in the evenings we grafted a hundred or a hundred and fifty perhaps, and during the winter I finished up the grafting of those scions on some roots that I had raised in a garden out by the falls. Those trees, many of them, are bearing yet in different parts of Minnesota. Being situated out on the prairie I was unable to meet with the horticultural society, and I don't suppose anyway that I could have raised money enough to pay the railroad fare in coming to their meetings. I was too badly crippled with the rheumatism to walk, and so I stayed at home. (Laughter). I did not meet with the society when the records were made up and so there was nothing said about my name in the list. I have closely watched the work of the society all these years and have been very much interested in it, and the first matter that I ever wrote in a newspaper upon horticultural affairs was an article that I wrote for the Wabasha Herald, when Frank Becket was editor, telling people how to grow and care for black raspberries. I remember that one man, on the strength of that article, ordered a thousand raspberries and planted them. At that time there was not a nursery in the state. I remember the meeting in Rochester, in 1867. I remember the talks that we had in regard to planting different kinds of trees and how much I was laughed at on account of my enthusiasm over the Duchess apple. But my enthusiasm was well grounded. Friend Mitchell, of Iowa, had some of the finest Duchess apple trees I have ever seen in the country. Well, ever since that time I have been

engaged in urging people in Minnesota to plant trees and berries. I have never forgotten, in all this horticultural work, an injunction I received from friend Wilcox when I was suffering from discouragement in consequence of the failures that I had met with. When every dollars worth of my apple trees had frozen and were lost, he wrote me a very consoling letter, saying, "Don't be discouraged. Keep right on planting, but plant some strawberries and raspberries to live on until you find what kind of apple trees will grow." I have not believed so much in apple trees since as I have in berries. In closing, let me speak of one instance in many, that goes to brighten the memory and make the light of this world. Down in Fillmore county one evening a sixteen year old girl was looking over my shoulder, commenting on the beautiful pictures of the strawberries in the catalogue that I had, and she said to me, "I have never had all the strawberries that I wanted to eat, in my life." And I asked her father if he was not ashamed of it, and he said that he was, and he was going to plant some. He did plant them, and two years afterwards I visited that place again and they all seemed glad to see me, and the young lady was glad to see me. Well, I understood it all when we went into the dining room. There was a dish of luscious berries sitting on the table, and when I spoke of their beauty, the good wife told me that they raised 900 quarts last year. As I sat there looking into the smiling, happy faces of those children and thought how they must have revelled in the strawberries the summer before, I turned to the daughter, who was then married, and asked her if she had had enough berries to eat, and she said, "Yes, far more than enough, and father has promised to give some plants to John, and we are going to start out with them when we go to housekeeping." And I thought to myself, "Well, Smith, there has been lots of kicking and cuffing around for you to stand, but this pays for all of it, to see these children enjoy these strawberries." (Applause).

Mr. Harris: In regard to what Mr. Smith says about the Fair at Rochester in 1866, I remember meeting Mr. Smith there and talking with him about the fruit that was exhibited.

Mr. Keel: Before it is too late, I move that we extend a vote of thanks to Mr. A. W. Sias for the encouraging paper that he sent us.

The motion was duly seconded and carried.

The society then adjourned until 9 A. M. Friday morning.

MORNING SESSION, FRIDAY, JANUARY 22.

The meeting was called to order by President Underwood at 9 o'clock.

President Underwood: As Mr. E. M. Chandler is present, I would suggest that he give us the benefit of his experience in vegetable gardening.

Mr. Chandler: I hardly know what to say, Mr. President, in regard to that matter. I have always come to these meetings believing that I could learn a good deal more than I could teach. I am always ready to listen to advice.

A Member: We would like to have you tell us how you grow the Hubbard squash. (*See index*, "Hubbard Squash, a Talk").

The society then listened to the reading of the following paper: "Celery Growing in Marsh Land," by J. A. Sampson, Excelsior. (*See index.*) The subject was then well discussed.

President Underwood: If there is nothing further to be said on this subject we will proceed with the program:

The secretary then read the following paper: "Canned Fruits and Pickles," by Mrs. A. Bonniwell, Hutchinson, Minn. (*See index.*)

Here followed an interesting discussion on the "Sugar Beet." (*See index.*)

President Underwood: If there is no further discussion on this subject, we will listen to the report of the committee on final resolutions.

Judge Moyer, chairman of the committee on final resolutions, then made the following report:

REPORT OF COMMITTEE ON FINAL RESOLUTIONS.

1. *Resolved*, That we appreciate the hospitable and courteous manner in which the citizens of Owatonna have received and entertained the members of this society.

2. *Resolved*, That we have been pleased with the exhibition of taste in horticulture shown in the parks and on the lawns of the beautiful city of Owatonna.

3. *Resolved*, That our hearty thanks are tendered to the citizens who have contributed to make this meeting one of the most pleasant in our history.

4. *Resolved*, That we thank the faculty and students of Pillsbury Academy for their most excellent entertainment on Wednesday evening.

5. *Resolved*, That the thanks of this society are due to the superintendent and teachers of the State Public School, for courtesies shown. The thorough and systematic manner in which this great public charity is administered merits the approval of every citizen of this state.

6. *Resolved*, That the thanks of this society are due to E. H. S. Dartt for the fatherly interest that he has manifested for the care and comfort of each member of this society; that we recognize his great devotion to the cause of horticulture. The work of his Experimental Station we especially commend as that of a faithful and devoted (and at the same time underpaid) friend of horticulture.

7. *Resolved*, That we thank the *Minneapolis Journal* for their full and fair report of the proceedings of this meeting.

8. *Resolved*, That thanks of this society are due to such of the railroads of this state as have granted reduced fares to the members of this society.

On motion the report was accepted.

The society then listened to the report of the committee appointed on the subject of the horticultural exhibit at the World's Fair.

Prof. Green, chairman of the committee, offered the following resolutions:

Resolved, That the Minnesota State Horticultural Society insist upon the necessity of an appropriation of $15,000.00 for the horticultural exhibit at the World's Columbian Exposition, as the minimum amount required to make such an exhibition as the interest of the state demands; and,

Resolved, That the Minnesota State Horticultural Society heartily endorses the recommendation of the executive committee in the appointment of A. W. Latham as superintendent of the horticultural exhibit of our state at the World's Columbian Exposition.

J. M. UNDERWOOD,
F. G. GOULD,
S. B. GREEN.

The resolutions were unanimously adopted by the society.

President Underwood: What will the society do with the motion made yesterday to change the time of meeting of the society to the second Tuesday in January, so as not to conflict with the meeting of the Iowa society?

Mr. Wilcox: I move the constitution be amended so as to change the time of meeting from the third Tuesday to the second Tuesday of January.

The motion was duly seconded and carried.

Secretary Latham: The executive committee appointed a sub-committee to arrange about the library at the headquarters in Minneapolis. The room is rented at the rate of five dollars per month, and I think the society should authorize the proper officers to draw upon the treasurer for this rent at suitable times. I now move that the president be authorized to draw orders for the payment of this rent from time to time, as the bills are presented.

The motion was duly seconded and carried.

The following delegates were then appointed: Mr. E. H. S. Dartt as delegate to the Wisconsin State Horticultural Society and Mr. J. M. Underwood as alternate; Mr. Clarence Wedge as delegate to the Northern Iowa Horticultural Society, and C. W. H. Heideman as delegate to the South Dakota State Horticultural Society.

Mr. Wilcox then introduced a resolution asking for the extension of the work of the experimental stations, which, after considerable discussion, was amended to read as follows:

Resolved, That a committee of three be appointed to confer with the Board of Regents, and urge a further appropriation of funds to assist in the carrying on of the work of our experimental stations.

The resolution was adopted by vote of the society. The president appointed as this committee, L. H. Wilcox, W. Elliot and J. H. Stevens.

A discussion then followed upon the advisability of empowering the executive committee to respond to the letters of inquiry sent out by the Department of Agriculture at Washington, and upon motion of Mr. Cutler, such authority was granted them.

On motion, the paper on "Bread Making," by Mrs. O. C. Gregg, Minneapolis, was accepted and placed on file for publication. (*See index.*)

Mr. Mitchell, the delegate from the Northern Iowa Society, in response to an invitation by the president, made a few fitting remarks, thanking the society for the courtesy extended to him, reviewing some of the work of the society, and closed by expressing the belief that the efforts of the society would be crowned with success.

The report of Mr. S. H. Kenney on "Sorghum" was received and placed on file for publication. (*See index.*)

The society here adjourned until 2 p. m.

AFTERNOON SESSION, FRIDAY, JANUARY 22.

Mr. Barrett, I wish to offer the following resolutions on the Experimental Farm School.

Resolved, That the oft repeated question, "Who shall take our places after we are gone?" is answered by our Agricultural School that is so well fitting our boys to further advance the interests of horticulture and transform our yet unsubdued Minnesota into a sylvan and fruit Eden; and we do unreservedly commend it as worthy in every sense of liberal support by the state and the people.

On motion the resolutions were adopted.

The following resolution in regard to the salaries of officers was also adopted:

Resolved, That the salaries of the officers of this society for the ensuing year be as follows: President, $25.00; secretary, $500.00; treasurer, $25.00; librarian, $15.00; and that the actual expenses of the executive committee in attendance on meetings, when called together, shall be paid.

President Underwood: The next thing on the program is the question box. (*These will be found under their proper heads.*)

On motion, the report of J. S. Harris, on "Entomology" was filed for publication. (*See index.*)

The secretary then read the following paper: "Injurious Insects of the Season," by Prof. Otto Lugger, St. Anthony Park. (*See index.*) A discussion followed.

On motion of Mr. Brand, the following resolution was adopted:

Resolved, That Mr. A. R. Federman, the reporter for the *Minneapolis Journal*, be tendered a special vote of thanks for the able manner in which he has reported the proceedings of the society.

On motion the reports of Otto L. Bullis and B. T. Wilcox, members of the committee on "Ornithology" were placed on file for publication. (*See index.*)

Reports of G. W. Fuller and William Somerville, on "Evergreens" were also filed for publication. (*See index.*)

The report of the committee on the fruit list was considered and adopted. (*See index.*)

Secretary Latham: In conversation with Mr. Harlow Gale, he informed me that the upper part of the new market, now being built in Minneapolis, was to be arranged for offices and so on, and I would suggest that the executive committee be authorized to make arrangements for the permanent location of the society in that building, or elsewhere, as they deem proper. I understand that there is to be a large hall in the market which can be used by the society when desired.

Mr. Dartt: I move that the matter be referred to the executive committee with power to act upon the same. After some discussion the motion was duly voted upon and carried.

The committee on obituaries, then made their report, which was accepted by the society. (*See index.*)

President Underwood: I believe that this closes the program for the meeting and if there is nothing more to be considered we are ready to adjourn.

Mr. Dartt: I reserved the right yesterday to address the society to-day. I want to offer an apology, as it were, to the

society on behalf of the people of Owatonna. Now, when we first came here there was a sort of chilliness about this room so far as our people were concerned, that I do not think exists now. Now, that might have been due partially to our people judging of you by your representative who lives here. Now, you know and so do they, that I am liable to get on people's corns unintentionally, but I claim, that as a rule, I get on the corns of those people that have large feet, and large corns too. (Laughter.) Then, too, the chilliness was partially due to the grippe. Many of our people had the grippe, or perhaps I should say that the grippe had many of our people. You know that the grippe and the cold weather make a very bad combination. But I think there has been an improvement since then. The people have become more acquainted with you and they like you. They do not judge you by your representative. They think you are better, in fact, they know you are better. In case you should ever come this way again, I promise you we will do better by you. Years ago I used to invite your society to come here, and I used to say "We will do as well by you as any town in the state, except Minneapolis." I could not say that we would quite equal that city. Last winter I said "We will do as well by you as any town in the state, Minneapolis not excepted." Now, I will say to you, that with the new court house that we are building if you come this way again we will do better by you than any town in the state. (Applause,) When you get out in the cold world and want friends, come right back to Owatonna. (Great applause.) I want to add one word more. I want to invite every member of this society to call on me whenever you come around to Owatonna. If you will send me word I will come down to the depot and meet you, and you must come and stay with me. I will show you the town and point out the best chances for investment, if you want to invest. (Laughter and applause.)

Mr. Keel: I move that we extend a vote of thanks to Brother Dartt for all that he has done for us.

The motion was duly seconded and carried by a rising vote.

On motion, the society then adjourned sine die.

REPORT OF LIBRARIAN FOR 1891.

HORTICULTURAL REPORTS AND OTHER BOOKS ON HAND JAN. 19, 1892, A. W. LATHAM, LIBRARIAN.

Minnesota State. Hort. Reports.	No. stored at Pillsbury Hall.		No. strictly reserved at Pillsbury Hall.		No. at Library and Office.		Total No.	
year.	Cloth.	Paper.	Cloth.	Paper.	Cloth.	Paper.	Cloth.	Paper
1866-73			50		40		90	
1874				50		50		70
1875				30		50		80
1876		236		50		50		336
1877		178		50		50		278
1878			25	25		50	25	75
1879				10				10
1880			34				34	
1881		600	50		50		100	600
1882	302	200	50		50		352	200
1883	620	140	50		50		720	140
1884		425	50		50		100	425
1885		600		50		50		700
1886		249	15	35	50	50		334
1887		72		50	50	50	50	172
1888		32		50	50	50	50	132
1889		200		50		50		300
1890		618	18	32		50	18	700
1891	360	50		50	60	117	420	217

EXCHANGES &C. AT LIBRARY AND OFFICE.

Name.	Year.	No.	Name.	Year.	No.
American Horticul. Society Report.	1885	3	Indiana Hort. Report	1875	1
American Horticul. Society Report.	1888	5	Indiana Hort. Report	1876	1
California State Agricul. Report	1872	1	Indiana Hort. Report	1877	1
California State Agricul. Report	1887	8	Indiana Hort. Report	1879	1
Cal. Fruit Growers' Convention	1889	1	Indiana Hort. Report	1880	1
Col. State Hort. Report	1882-3-4	7	Indiana Hort. Report	1881	1
Col. State Hort. Report	1885	7	Indiana Hort. Report	1882	1
Col. State Hort. Report	1886	7	Indiana Hort. Report	1885	1
Dakota Horticulture and Forestry.	1885	3	Indiana Hort. Report	1886	1
Dakota Forestry and Horticulture.	1885	31	Iowa Hort. Rep	1879	1
Department of Agriculture Report.	1876	1	Iowa Hort. Rep	1880	1
Department of Agriculture Report	1878	1	Iowa Hort. Rep	1881	1
Department of Agriculture Report.	1879	1	Iowa Hort. Rep	1882	5
Department of Agriculture Report.	1884	1	Iowa Hort. Rep	1884	8
Department of Agriculture Report.	1885	1	Iowa Hort. Rep	1885	3
Department of Agriculture Report.	1886	1	Iowa Hort. Rep	1886	1
Illinois Hort. Report	1868	2	Iowa Hort. Rep	1887	1
Illinois Hort. Report	1869	3	Iowa Hort. Rep	1888	1
Illinois Hort. Report	1871	5	Iowa Hort. Rep	1889	1
Illinois Hort. Report	1872	6	Iowa Agri. Rep	1871	1
Illinois Hort. Report	1873	7	Iowa Agri. Rep	1872	1
Illinois Hort. Report	1874	8	Kansas State Hort. Report	1872	1
Illinois Hort. Report	1884	19	Kansas State Hort. Report	1874	1
Illinois Hort. Report	1885	19	Kansas State Hort. Report	1876	1
Illinois Hort. Report	1886	22	Kansas State Hort. Report	1881	4
Illinois Hort. Report	1887	24	Kansas State Hort. Report	1884	2
Illinois Hort. Report	1888	25	Kansas State Hort. Report	1885	3
Illinois Hort. Report	1889	23	Kansas State Hort. Report	1886	4
Illinois State Agri. Report	1867-8	7	Kansas State Hort. Report	1887-8	1
Illinois State Agri. Report	1871	9	Kansas State Hort. Report	1890	6
Illinois State Agri. Report	1874	12	Maine Hort. Report	1890	1
Illinois State Agri. Report	1875	13	Mass. Hort. Rep	1848	1
Illinois State Agri. Report	1876	14	Mass. Hort. Rep	1852	1
Indiana Hort. Report	1874	1	Mass. Hort. Rep	1865	1

EXCHANGES, &C., AT LIBRARY AND OFFICE—*Continued.*

Name.	Year.	No.
Mass. Hort. Rep.	1866	1
Mass. Hort. Rep.	1867	1
Mass. Hort. Rep.	1868	1
Mass. Hort. Rep.	1869	1
Mass. Hort. Rep.	1870	1
Mass. Hort. Rep.	1871	1
Mass. Hort. Rep.	1872	1
Mass. Hort. Rep., Part 2.	1875	1
Mass. Hort. Rep., Part 2.	1876	1
Mass. Hort. Rep., Part 2.	1877	1
Mass. Hort. Rep., Part 2.	1878	1
Mass. Hort. Rep., Part 2.	1884	1
Mass. Hort. Rep., Part 1.	1885	1
Mass. Hort. Rep., Part 2.	1885	4
Mass. Hort. Rep., Part 1.	1886	1
Mass. Hort. Rep., Part 2.	1887	7
Michigan Board of Agri. Report.	1870	1
Michigan Board of Agri. Report.	1872	1
Michigan Board of Agri. Report.	1873	1
Michigan Board of Agri. Report.	1875	1
Michigan Board of Agri. Report.	1876	1
Michigan Board of Agri. Report.	1887	5
Michigan Pomol. Society Report.	1871	1
Michigan Pomol. Society Report.	1873	1
Michigan Pomol. Society Report.	1874	1
Michigan Pomol. Society Report.	1875	1
Michigan Pomol. Society Report.	1876	1
Michigan Pomol. Society Report.	1877	2
Michigan Pomol. Society Report.	1878	1
Michigan Pomol. Society Report.	1879	2
Michigan Pomol. Society Report.	1880	5
Michigen Hort. Society Report.	1881	1
Michigan Hort. Society Report.	1882	1
Michigan Hort. Society Report.	1884	1
Michigan Hort. Society Report.	1885	4
Michigan Hort. Society Report.	1886	3
Mississippi Valley Horticul. Report.	1885	3
Mississippi Valley Horticul. Report.	1884	2
Missouri State Hort. Report.	1880-1	1
Missouri State Hort. Report.	1884	3
Missouri State Hort. Report.	1885	3
Missouri State Hort. Report.	1886	1
Missouri State Hort. Report.	1887	4
Missouri State Hort. Report.	1888	1
Montreal Agricul. and Hort. Report.	1876	1
Montreal Agricul. and Hort. Report.	1877	7
Montreal Agricul. and Hort. Report.	1878	1
Montreal Agricul. and Hort. Report.	1881	2
Montreal Agricul and Hort. Report.	1882	10
Montreal Agricul. and Hort. Report.	1883	14
Montreal Agricul. and Hort. Report.	1884	25
Montreal Agricul. and Hort. Report.	1885	26
Montreal Agricul and Hort. Rep.	1886-7	14
Nebraska Hort. Report.	1871	1
Nebraska Hort. Report.	1872	1
Nebraska Hort. Report.	1877	1
Nebraska Hort. Report.	1880	1
Nebraska Hort. Report.	1884	1
New Jersey Hort. Rerort.	1876	1
New Jersey Hort. Report.	1877	1
New Jersey Hort. Report.	1878	1
New Jersey Hort. Report.	1879	1
New Jersey Hort. Report.	1881	1
New Jersey Hort. Report.	1882	1
New Jersey Hort. Report.	1883	1
New Jersey Hort. Report.	1885	3
New Jersey Hort. Report.	1886	5
New Jersey Hort. Report.	1887	3
New Jersey Hort. Report.	1888	4
Ontario Fruit Growers' Ass'n. Rep.	1887	1
Ohio State Horticultural Rep.	1878	1
Ohio State Horticultural Rep.	1879	1
Ohio State Horticultural Rep.	1880-1	1
Ohio State Horticultural Rep.	1882-3	1
Ohio State Horticultural Rep.	1884-5	1
Ohio State Horticultural Rep.	1885-6	5
Ohio State Horticultural Rep.	1886-7	3
Ohio State Horticultural Rep.	1887-8	1
Ohio State Horticultural Rep.	1889-90	1
Ohio Agricultural Report.	1864	1
Ohio Agri. Experiment Station Rep.	1882	1
Ohio Forestry Bureau Report.	1887	1
Penn. Agricultural Report.	1884	1
Penn. Agricultural Report.	1885	1
Penn. Agricultural Report.	1886	1
Penn. Agricultural Report.	1887	2
Penn. Horticultural Report.	1882	1
Penn. Horticultural Report.	1883	1
Pomology of Maine Report.	1885	2
Pomology of Maine Report.	1886	3
Pomology of Maine Report.	1887	8
Pomology of Maine Report.	1873	4
Pomology of Maine Report.	1875	6
Smithsonian Report.	1884	1
Transactions of State Agric., &c., of University of Wisconsin.	1884	1
Vermont Board of Agricul. Report.	1878	1
Wisconsin State Agri. Report.	1869	1
Wisconsin State Hort. Report.	1871	1
Wisconsin State Hort. Report.	1872	1
Wisconsin State Hort. Report.	1873	1
Wisconsin State Hort. Report.	1875	1
Wisconsin State Hort. Report.	1878	1
Wisconsin State Hort. Report.	1879-80	1
Wisconsin State Hort. Report.	1880-81	5
Wisconsin State Hort. Report.	1881-82	2
Wisconsin State Hort. Report.	1883	1
Wisconsin State Hort. Report.	1884	3
Wisconsin State Hort. Report.	1885	2
Wisconsin State Hort. Report.	1886	17
Wisconsin State Hort. Report.	1887	2
Wisconsin State Hort. Report.	1888	3
Wisconsin State Hort. Report.	1890	1
W. New York Hort. Report.	1875	1
W. New York Hort. Report.	1876	1
W. New York Hort. Report.	1877	1
W. New York Hort. Report.	1879	1
W. New York Hort. Report.	1880	1
W. New York Hort. Report.	1881	3
W. New York Hort. Report.	1883	1
W. New York Hort. Report.	1885	1
W. New York Hort. Report.	1886	1

Mr. E. A. Cuzner, the assistant Librarian, reports 3,200 reports sent out this year. I have sent out by mail some 350 reports of 1891, and by freight and express 675 more of same year, making a total, sent out this year, of 4,225 volumes.

Respectfully submitted,

A. W. LATHAM, Librarian.

REPORT OF J. S. HARRIS ON LIBRARY COMMITTEE, JAN. 1, 1892.

To the President and Members of the Minnesota State Horticultural Society.

At a meeting of the executive committee held at the office of President Elliot in Minneapolis I was elected a member of a committee on library. I have up to this date secured books and pamphlets as follows viz: Reports of U. S. Department of Agriculture for the years 1886, 1887, 1888, 1889, 1890; Wisconsin Farmer's Institute for 1889; Wisconsin Agricultural Experiment Station 1888, 1890; Bushburg Catalogue of Grapes; Report of U. S. Bureau of Animal Industry, 1891; Sugar Beet Industry, 1890; Statistics of Grape Culture, 1880; Fungus Diseases of Grapes, 1886; Prize Essay on Forest Growing, by J. T. Allan; Report of Food Adulteration, 1890; Report of Root Knot Disease, 1889; Report of Association of Agricultural Chemists, 1890; Farmer's Bulletin No. 4, U. S. D. A., 1891; Vegetable Pathology, 1890; Sisal Hemp Culture; Papers on Horticulture and Kindred Subjects, 1891; What is Forestry? 1891; Special Report Chief Weather Bureau, 1891; Experiments with Sugar Beets, 1890; Experiments with Sorghum, 1890; Destructive Insects, 1891; Bulletin No. 2, N. D. Agl. College, 1891; Catalogue of Economic Plants by W. Saunders, U. S. D. A., 1891; Wild Grapes of North America by T. V. Monson; Report Secretary of Agriculture, 1891; Report of Observations and Experiments in the Div. of Entomology, 1890; Report of Substitution of Metals for Wood, 1890; Reports of American Pomological Society for 1877, 1879, 1881, 1887, 1889; Monthly Crop Bulletin of Dept. of Agl.

REPORTS OF DELEGATES.

REPORT OF DELEGATE TO THE AMERICAN POMOLOGICAL SOCIETY.

BY J. S. HARRIS.

Mr. President and Members of the Minnesota State Horticultural Society:

It was truly a pleasure and one of the greatest privileges of my life to be able to attend the twenty-third session of the American Pomological Society, held at Washington, D. C., as the delegate of your society, although I must confess that I felt much like a beardless youth in pomology as compared with the learned, experienced and successful men who largely comprise its membership. The meeting was held in the large lecture room of the National Museum, on the 22d, 23d, 24th and 25th of September, 1891, on a special invitation of the Secretary of Agriculture, J. M. Rusk, to give the Department an opportunity to become better acquainted with the pomological workers of America, and to afford them an opportunity to become familiar with the workings of the Division of Pomology, with the view of establishing a more frequent and intimate intercourse between the fruit growers and the department; and further, to enlist their hearty co-operation in the efforts now being undertaken to extend fruit culture to all parts of the country by selecting and experimenting for the most hardy and valuable for each section, and also in reclaiming and developing such of the native wild fruits as give promise of value, and introducing from other countries such as will be desirable additions to our lists. Ten o'clock A. M. found the room pretty well filled with members and the meeting was called to order by President P. J. Breckmans. After an eloquent prayer by Rev. S. M. Newman, the Assistant Secretary of Agriculture, Hon. Edwin Willets, delivered the address of welcome in behalf of the Department of Agriculture. In the course of the address he gave a vivid picture of the wonderful growth of pomology in the United States since the organization of the society. "Then, California was practically unknown and Florida was chiefly renowned for everglades and hostile Seminoles. The orange, the lemon, the fig, pomegranate, pineapple and olive were essentially a luxury imported from foreign shores. The strawberry, always luscious, was still in a large measure sought for by the boys and girls in the meadows. The farmer or home that had a tasteful wild grape, commanded a ready market, and many a small boy or good housewife by no means despised the wild native crab apple. In these things a complete revolution has been wrought since the organization of this society." He alluded to the improved methods that had been brought about, the new varieties originated, propagated and introduced, the new fruits brought from other countries, the assiduity with which soil, climate and adaptability had been studied, the

genius shown in deriving new strains of flavor and the sacrifice and fortunes spent in endeavoring to make a hardy stock for the most acceptable qualities by the members of the society and those whom they succeed, all of which are recorded, and will be remembered by generations to whom the names of members of this society have become household words. He then alluded to the importance of the work that had been undertaken by the Department of Agriculture, four grand divisions out of fourteen being devoted largely to the interests which this pomological society represents. He concluded his address as follows: "It is because of our work that we are glad to meet the other and more numerous workers in this great field of fruit culture, and to become personally acquainted with you. Your coming is an inspiration to us, and may your leaving be followed by a higher appreciation of what each in his respective sphere is accomplishing, and a most hearty co-operation in the great work in which we are jointly interested." C. L. Watrous, of Des Moines, Iowa, responded to the address of Mr. Willets in well chosen words, and the society immediately proceeded to business.

At the afternoon session of this first day President P. J. Breckmans delivered an interesting address in which he defined the purposes and methods of the society. He congratulated the members on the pleasant auspices under which this convention was being held and spoke of the good work the society is doing in the cause of educating the people in the practical details of successful fruit growing. Upon the vice-presidents he said, rested much of the responsibility of propagating the ideas to their several state societies, and of demonstrating the relations between scientific pomology and practical fruit growing. Following the president's address was the election of officers for the ensuing term of two years, which resulted as follows: Prosper J. Breckmans, of Georgia, president; C. L. Watrous, of Iowa, first vice-president; G. C. Brackett, of Kansas, secretary; Benjamin G. Smith, of Massachusetts, treasurer. Also vice-presidents or superintendents were elected for each one of the several states and Canada. The remainder of the afternoon and evening sessions was devoted to the reading and discussion of papers as follows: "Results of Experiments with Small Fruits," by T. T. Lyon, of Michigan; "How to Make Small Fruit Culture Pay," by J. M. Hale, of Connecticut; "New and Promising Small Fruits," by J. T. Lovett, of New Jersey; "Recent Progress in the Treatment of the Diseases of Pomaceous Fruits," by Prof. B. F. Galloway, Department of Agriculture; and "Chemistry of Peach Yellows," by Dr. Erwin F. Smith, Department or Agriculture. The meeting was opened promptly on time on the second day with a good attendance of members apparently ready and anxious for business. The first work of the morning was revising or starring the catalogue. This being the first national pomological society in origin, its catalogue stands as authority upon all questions relating to characteristics and nomenclature of all American fruits. This work is being done in accordance with rules adopted at the session of 1883. The method of procedure is as follows: Some one is designated for the occasion who mounts the platform [this time it was C. A. Garfield, of Michigan] and with a copy of the catalogue in hand reads off the varieties in alphabetical order, beginning with Aletson's early. Many of them pass without comment while others arouse considerable informal discussion, their value being told by members who

are most familiar with them. Some receive an additional star for certain districts. Others loose a star for districts where they have been tried and not found satisfactory. In many cases names are stricken from the list on account of not having proved satisfactory or good enough to be worthy of perpetuation or on account of their identity with some variety with an older or preferable name. Then too, when some member knows a variety has been tried in his state, and proved a success, he would request that it be starred for his state. In addition, considerable progress is being made in reforming some of the more objectionable names in the catalogue. After going through with the apples and crab apples the reading and discussion of papers was resumed. First paper was on "Pruning," by D. W. Adams, of Florida, who referred to pruning as a sort of hereditary error. "The present system of pruning proves that we believe in the total depravity of all fruit and that it can only be saved by the means of wholesale butchery. The first and direct results of cutting any tree is to do it a permanent and irreparable injury ...It lays a tree open to all sorts of diseases and is a defiance to all the laws of nature, &c." This paper elicited a warm discussion.

The space alotted me warns me that I must hasten along. The remainder of the second day was taken up with papers of vital interest to the fruit grower. Such as "Heredity and Environment in Originating New Fruits," "Fruit Districts Geologically and Climatically Considered," "Recent Advance in Dealing with Insects Affecting Fruits," "Spraying of Orchards," "Local Pomological Problems," and the "Propagating of Apple on Piece and Whole Roots."

On the third day a portion of the forenoon was taken up in the revision of the fruit lists, and after they were finished a full and profitable day was put in on the remaining subjects on the program. The final adjournment took place on the forenoon of the fourth day and thus ended one of the most successful conventions ever held by the society. The society was organized in 1848, with the late Marshall P. Wilder for president, who was continuously re-elected at every meeting and held the office at the time of his death, Dec. 16, 1886, at the ripe age of eighty-eight years. Its membership comprised such men as the Downings, Barry, Elwanger, and a score of the pomological giants who have elevated the horticulture of America to its present proud position. In connection with the meeting there was an elegant display of fruits comprising everything in the lists from the apples, pears, plums and grapes of the north to the oranges, bananas and most delicate fruits of the south. The display was tastefully arranged in one of the exhibition rooms of the museum and was a very unique one, presenting at a glance the great resources of our country. The exhibition room was thronged with admiring visitors during several hours of each day. Minnesota and Wisconsin were the only northwestern states that had any considerable exhibits, and they were confined to apples that had no occasion to blush when finding themselves in the company of those from more favored states. Nothing in the whole exhibit excelled the Wealthy, McMahon, and a number of other seedlings of northwestern origin for fairness and beauty of appearance. It is customary at these meetings to award a limited number of Wilder silver and bronze medals to articles of especial merit. The committee of awards reported as follows: A Wilder silver

medal to the Virginia State Board of Agriculture, represented by Henry L. Lyman, Charlottesville, Va., for 335 plates apples, 27 plates pears, 78 varieties grapes, 5 plates of plums; to Elwanger and Barry, Rochester, N. Y., for 112 plates of pears; P. J. Breckmans, Augusta, Ga., 8 varieties Japanese persimmons, 1 plate *lemonium trifohantum*, 2 plates Keiffer pears, 1 plate Hawaii pears, 4 varieties *prunus japonica*, 3 varieties figs; Rev. Lyman Phelps, Florida, 8 varieties lemons, 5 varieties limes, 4 varieties Japanese persimmons, 1 plate pommela, and an extensive and highly instructive collection of citrus hybrids and crosses.

Bronze medals were awarded to Luther Burbank, California, collection of seedling quinces; Chas. H. Hedges, Charlotteville, Va., 78 plates of grapes; J. S. Harris, LaCrescent, Minn., 28 varieties of Minnesota apples; Wisconsin State Horticulture Society, 39 varieties of apples; Jewell Nursery Company, 26 varieties seedling apples; P. S. Dinsmore, River-Side, 29 plates of apples; J. W. Potter, Piedmont, Va., 52 varieties of apples; J. L. Babcock, Tidewater, Va., 130 plates apples.

In addition there were several honorable mentions.

I am so favorably impressed with the importance of the work of this great society that I bespeak for it the hearty co-operation of our own State Horticultural Society and although advancing age warns me that I cannot much longer hope to meet with them, Minnesota now has one life member of the organization. The next meeting of the society will be held at Chicago, Ill., in 1893, the exact date not yet fixed.

The American Pomological Society, may it live and flourish until long after every fruit problem has been solved, until the fullest anticipations of the prospects are fully realized, and then to use the words of President Wilder, "May the society go on conferring blessings on our country until every hearthstone and fireside shall be gladdened with the golden fruits of summer and autumn, until the thanksgiving and perfume of the orchard shall ascend together like incense from the altar of every family in the broad land, and the whole world realize as in the beginning the blissful question of dwelling in the 'Garden of the Lord'."

REPORT OF DELEGATE TO THE SOUTH DAKOTA HORTICULTURAL SOCIETY.

BY DEWAIN COOK, WINDOM.

The third annual meeting of the South Dakota Horticultural Society was held at the city hall in the city of Yankton, on the 9th, 10th and 11th of December, 1891.

President H. C. Warner, of Forestburg, opened the meeting on the evening of the 9th with his annual address, in which he stated that the past year had been one of encouragement to the horticulturist.

In the southern district there was an abundant crop of fruit. In all portions of the central district there was a good crop of small fruit and plums and a few apples where trees had reached fruiting age. In the northern district the May frost had greatly reduced the fruit crop. He also stated that plants and trees had gone into winter quarters in better condition than for three years past, and that the prospects of 1892 were cheering.

For three years past they had been asking legislative aid to the extent at least of publishing their reports that the people may have the benefit of the experience of those who are giving their lives to horticultural work, but thus far without success.

After the address of welcome by Mayor Powers, of Yankton, and the response by C. A. Cowles, of Vermilion, the secretary, Prof. Charles A. Keffer, of Brookings, read his paper "Forestry as a Government Problem."

The morning session of the second day was well attended. Committees were appointed, and some interesting papers were read and discussed.

Delegate C. W. Young, of Concord, Nebraska, and the Minnesota delegate were made honorary members of the society.

Your delegate was honored by a place on the awarding committee and on the committee revising the fruit list.

The Russian thistle was reported a great pest in some portions of the state.

Mr. T. H. Coniff, of the World's Fair commission, addressed the society on the advisability of assisting the commission with a horticultural exhibit from the state.

A committee of three was appointed to work in conjunction with General Manager Gibbs of the commission.

President McLouth, of the Agricultural College at Brookings, delivered the address, "Horticulture and the Home."

A valuable paper was read by Mrs. Mary L. Clark, of Drakola, on "How I Grew Plants in the Winter."

A fine collection of conifers and other trees adorned the room. A large collection of chrysanthemums, from the Agricultural College, beautified the tables. Eleven varieties of apples and some fifty specimens of canned fruit were exhibited.

Mr. Gourney, of Nebraska, exhibited several cans of fruit preserved by the silicic acid method. He also gave us an exhibition of side grafting which was considered a superior way, especially for plums and for top working.

At the morning session of the third day, premiums were awarded; the committee on the revision of fruits made their report, and officers and delegates were elected.

The following are the varieties of apples which were on exhibition: Ben Davis, Walbridge, Grimes Golden, Pippin, Wealthy, Seek-no-further, Willow Twig, Wallawathee, Bellflower, Baldwin and Perry Russet.

The following varieties of fruit were recommended for cultivation: Of apples, Duchess, Wealthy, Whitney and Hibernal; for trial, Tzalletsreff, Annis, Charlamoff, Red Queen, and Antonovka; of crabs, Early Strawberry, Hyslop, Briars Sweet and Minnesota; for trial, Snyder; of plums, Desota, Forest Garden, Rollingstone, Wolff, Harrison Peach and best natives of Dakota, and the Miner for the southern district. Pears for trial, Bessamanka and Flemish Beauty; cherries, dwarf or sand cherry; raspberries; for red, Turner and Philadelphia; black, Souhegan, Ohio and Gregg. The blacks should be given some winter protection. Of blackberries, the Lucretia dewberry for trial; of strawberries, Crescent with Downers Prolific or Charles Downing; for trial, Warfield No. 2, Haviland and Windsor, fertilized by Glendale or Mt. Vernon; of grapes, Concord,

Janesville, Moore's Early, Worden and Martha; currants, Red Dutch, White Grape, Victoria and Long Bunch Holland; gooseberries, American Seedling and Houghton.

The following officers were elected for the ensuing year: For president, Hon. H. C. Warner, of Forestburg; for first vice-president, L. A. Van Osdel, of Yankton; for second vice-president, S. S. Wentworth, of Cresbaid; for secretary, Prof. Charles A. Keffer, of Brookings; for treasurer, Mrs. Mary L. Clark, of Drakola; and also one director for each of the ten districts. Mr. George E. Whiting, of Yankton, was elected delegate to attend the Nebraska meeting, and Prof. Charles A. Keffer was elected delegate to attend this meeting.

The next annual meeting was voted to be held at Yankton.

At 12 o'clock M., the meeting adjourned.

DEWAIN COOK, Delegate.

REPORT OF DELEGATE TO SUMMER MEETING OF THE WIS. STATE HORTICULTURAL SOCIETY.

J. S. HARRIS, LA CRESCENT.

The annual summer meeting, and fruit and flower exhibition of the Wisconsin State Horticultural Society was held at Kilbourne City, Wis., June 23 and 24, and proved the most successful meeting ever held by the society. The program was a good one, and filled in the time both pleasantly and profitably. Among the subjects discussed were "New varieties of Strawberries," "Horticultural Education, or Teaching Horticulture in Public Schools," "The Adornment of Home, "Gardens of Farmers and Villagers," etc.

The discussion on new varieties of strawberries was opened with the reading of a paper by Geo. J. Kellogg, giving descriptions and results of tests so far made. But few, if any, varieties fully substantiate the claims made for them by originators and introducers, and in the hands of the common cultivator many of them prove a delusion; but there are some varieties that are fairly good in quality, and so productive and attractive in appearance, that they show a marked advance in this most valuable fruit, and are destined to supersede many of the older varieties, that are now extensively grown for market, such as Crescent, Wilson and Capt. Jack.

The teaching of horticulture in the public schools meets with general favor. The successful man will be the one who understands his business, and goes about it in earnest. Vegetable physiology, the art of propagating by seed, layer, bud or graft, setting, pruning and care of plants and trees are attractive studies to most children, and they would stimulate the love of the beautiful, as well as fit the coming man for usefulness and success. The

PAPER ON ADORNMENT OF HOME

by Mrs. Florence A. Brinkman, was an able document, clear, and forcibly delivered. No class of people have so good opportunities for beautiful

and comfortable homes as the farmers. The writer showed how the homes of the poorest and most humble of our people may be made attractive without great expense in time or money by the planting of trees, shrubs, vines and flowers, and its effects in promoting love of home, happiness, morality and patriotism. The

THE ATTENDANCE OF FRUIT GROWERS

from various parts of the state was good, and the hall was well filled with an appreciative audience of the people of the town and surrounding country. Besides the state society, Wisconsin has some twenty county and local societies. These are made auxiliary on condition that they report direct to the state society, and send delegates to the annual meetings, the expenses of one for each being paid out of the funds received from the state, as are also the expenses of parties invited to furnish papers. This method is rather expensive, but adds very much to the strength, interest, and usefulness of the society, and sets it more on the basis of a state institution, than when the meetings are dependent on a few leading spirits and the local horticulturists to carry out the program. The practice of holding these summer meetings at different points in the state is working great good to the cause. Wherever a meeting is held marked benefits soon follow in better gardens, more fruit, and improvement of the home surroundings and public grounds.

One peculiar and encouraging feature of this meeting was the great numbers of boys and girls in the audience, ranging between the ages of ten and sixteen years, for which President Thayer is entitled to great credit. It is often remarked by those who look over the assemblage of horticulturalists, and see none but middle aged and veterans there, "Where are your successors coming from?" Wisconsin has demonstrated that, if you give the women and children a part in the meeting, they will be there. Mr. Thayer offered a prize of twenty-five Warfield strawberry plants to every child in Wisconsin, who would pick and arrange a bouquet of flowers suitable to be placed upon the exhibition tables or used in decorating the hall. About twenty prizes were awarded to children under fifteen years of age.

The discussions brought out that Bubach No. 5 produces the largest berries, but is not firm enough to endure distant shipments. Haverland has more bushels for a near market than any other variety, and sells well, although the quality is not the best. Warfield No. 2 is the best and most profitable variety to grow for shipping. VanDeman is the earliest variety that promises to have merit enough to warrant its general trial. Parker Earle on its first year's trial has nearly come up to promises, and indications are that it will become a leading variety. Nichols' Early is the most unpromising for Wisconsin of any variety of recent introduction. Three best varieties for the farmer's garden, Jessie, Bubach No. 5, Warfield No. 2. Three best varieties to use for fertillizing pistilate varieties, Parker Earle, Capt. Jack, and Jessie. Five best shipping varieties of recent introduction, Granby, Great Pacific, Warfield, Parker Earle and Crawford.

THE EXHIBIT.

After taking into account the extreme drouth that had prevailed throughout the season up to the beginning of ripening, and the many frosts occuring in May, the exhibition was a surprise to every one. It was

the largest and most complete display of select strawberries that has ever been seen in the Northwest, especially of the newer varieties that are as yet in the experimental stage. At least a score of varieties were as large and attractive as select Jessies. There were 180 plates shown in competition for prizes, comprising 48 varieties. The older varieties, such as Wilson, Crescent, Capt. Jack and Downing, were poorly represented. The Bubach No. 5, Jessie, Haverland, Parker Earle, Granby's Prize and Eureka seemed to take the lead in size, form and attractive appearance. The most worthless appearing variety in the whole exhibition was the Nichols Early.

REPORT OF E. H. S. DARTT, DELEGATE TO WISCONSIN HORTICULTURAL SOCIETY.

Mr. President and Members:

It afforded me great pleasure to attend the meeting of the Wisconsin State Horticultural Society, held at Madison, Feb. 2 to 5, 1892, as your representative. It was more particularly gratifying because I was a pioneer in that state in its territorial days of 1844, and labored in the horticultural field there for twenty-five years. The meeting was held in the senate chamber, and was well attended by genuine philanthropists. The old men were there for counsel, and the young men, I suppose, for war, but really some of the veterans seemed most warlike. The superiority of their climate was clearly shown by their magnificent show of fine apples. In this exhibit what are known as the Waupaca county seedlings were very conspicuous. Waupaca county is to Wisconsin about what the Minnetonka region is to Minnesota. Its sweep of prevailing winds is similar, passing along the valley of the Fox river, which, with its windings and frequent expansions, and the many lakes in the region, constitutes a water surface of no small magnitude. This, and the fact that the altitude is not great, makes the valley of the Fox one of the best fruit growing regions of the state. Many of these and other Wisconsin seedlings are on trial at the Owatonna tree station, and several new ones from this and other sections will be added as a result of this visit; and we may reasonably hope that a few will survive our next very severe winter. Not enough Russian varieties were shown to make a collection. One variety, however, the Repka Malenka, was of fine appearance and in perfect condition, maintaining its reputation as a very long keeper. Crosses of this variety retaining the long keeping quality are likely to prove valuable to us.

The following is part of the fruit list as recommended:

Apples, 1st list—Oldenburg, McMahon, Hibernal, Wealthy and Tetofsky; *Crabs*, Transcendent, Hyslop, Martha and Sweet Russet; *Plums*, Desota, Cherry, Rollingstone and Ocheda; *Grapes*, Moores Early, Worden, Concord, Delaware, Brighton and Woodruff; *Strawberries*, Warfield, Wilson, Crescent and Sandovin.

The papers read were usually short, but comprehensive, and in no instance was valuable discussion crowded out for want of time. As a sample I give that of A. G. Tuttle, of Baraboo, entire:

"SOME THINGS I HAVE LEARNED IN FORTY YEARS EXPERIENCE AS AN ORCHARDIST IN WISCONSIN.

"That the extreme and long continued cold of some of our winters and the excessive heat of the summer's sun, with a dry atmosphere, are the main causes of injury.

"That the best grounds for orchard planting are the elevated, well drained, clay lands.

"That trees should be trained with bodies from 4 to 6 feet, according as their manner of growth is upright or spreading.

"That the bodies of trees should be protected from the summer sun.

"That the orchard should be cultivated in some hoed crop. Neither mercantable fruit nor healthy trees can be grown with trees long in sod.

"That it is necessary to wage continual war against insect enemies, and that they are more destructive in sodded than in cultivated ground.

A. G. TUTTLE."

I would add, that the orchard is best on a northern slope, and after it comes into bearing *must be kept well manured*, necessitating the precaution of planting varieties not predisposed to blight.

Horticultural progress has not been as rapid at the University as could be desired. About 1870 an orchard was planted on the southern slope of College Hill. A little later a larger orchard of the same and other varieties was planted on the northern slope. That on the southern slope soon died out, while that on the northern slope became one of the most successful orchards in the state, and trees remained healthy and productive until two years ago, when the orchard was removed because it had become public plunder and was of no benefit to the University. Here are pointers for somebody. New plantations of nursery stock have been made by Prof. Goff, present horticulturist, who is doing all in his power to promote horticultural interests. A kicker hints that scientists are not always practical workers, and that by sticking too closely to their books they are likely to get left behind in this progressive age. It occurs to me that too much is required from the professor of horticulture in our agricultural colleges. In the first place, he must teach and he must find means for illustrating his teachings by practical demonstrations. This work well done would seem to be enough for one man, but in addition to this, he is expected to carry on, or at least oversee, somewhat expensive experiments in the garden, the nursery, the greenhouse and the orchard, and report results *all for the public good*. All this he may *possibly* do in a thorough and systematic manner, *provided* he has the assistance of well skilled laborers in each department. This skilled labor is not always supplied, and then he will surely be blamed for incompetency.

Three sub-stations were established two years ago by the State Horticultural Society, which pays their expenses, amounting this year to less than $100 each. In these stations the people express great confidence. One man said, that had they been established twenty years ago, it would have saved him $1,000. If the delay has cost one man so much, the loss to the state must have been immense.

One advantage of these stations is the check they impose on persons who seek to boom new varieties for personal gain. It is safe to declare that there is not now nor will there be a plant, vine or tree much superior to the best other plants, vines and trees of its class. If a doubt is enter-

tained on this point, we have but to refer to our fruit lists, and note the ever changing positions of the different varieties. Circumstances and printer's ink may suddenly elevate varieties and men to such high positions that there must be a fall; but true merit, though slow in its action, will eventually place every variety and every man on their respective lists *just where they belong.*

I notice that their constitution requires them to elect one member of their executive committee from each congressional district. Ours is more liberal. We can elect the whole committee from one locality if we prefer to do so.

Although papers were read on raising vegetables, yet the opinion was expressed that the vegetable department properly belonged with the agricultural society.

If my memory is correct, flowers were scarcely mentioned. Presumably members prefer to discuss things useful rather than those that are purely ornamental. Their motto seems to be "Short papers and much discussion." In this they make a virtue of necessity, for their volume of transactions cannot be as large as ours; and in the eye of the busy world this is a genuine virtue, for it prefers that men's opinions in regard to their particular hobbies shall be well simmered down.

On the whole it appears to an outsider that this has been a well managed, harmonious, and very profitable meeting.

E. H. S. DARTT.

AUXILIARY SOCIETIES.

REPORT OF EAU CLAIRE, WIS. HORTICULTURAL ASSOCIATION

To the Minnesota State Horticultural Society, January 1, 1892:

OFFICERS OF THE ASSOCIATION.

President—Peter S. Price, Eau Claire.
Vice-President—W. R. Culbertson, Eau Claire.
Secretary—R. Elwell, Eau Claire.
Treasurer—J. F. Case, Eau Claire.

COMMITTEES.

Finance—M. W. Wisner, Frank Keefe, Chas. E. Hazen.
Fruits and Vegetables—J. F. Case, Alfred Soper, G. W. Lufkins.
Observation—O. T. Remington, Jacob Garrett, Chas. E. Burce.
Floriculture—Mrs. W. Sherman, Mrs. Burroughs, Mrs. R. Elwell.
Experiments—J. F. Case, Z. B. Stillwell, W. R. Culbertson.

LIST OF MEMBERS.

P. S. Price, Eau Claire; O. T. Remington, Amy, (Dunn county); W. R. Culbertson, Eau Claire; J. F. Case, L. G. Stone, Chas. E. Hazen, J. C. Barland, G. W. Lufkins, Alfred Soper, Mrs. W. R. Culbertson, Chas. E. Burce Mrs. Wesler Sherman, Mrs. Burroughs, Mrs. L. G. Stone, Mrs. R. Elwell, M. W. Wisner, R. Elwell, Jacob Garnett, F. E. Keefe, Andrew Mohult, Z. B. Stillwell, Mrs. Z. B. Stillwell, Eau Claire.

This association was organized on March 14, 1891, and holds monthly meetings on the second Saturday of each month; its place of meeting is in the court house at Eau Claire.

At the meetings of July, August and September, some fine exhibits of strawberries, raspberries, blackberries and gooseberries were made by Messrs. Price, Case, Culbertson, Stone and Stillwell.

The crop of small fruits in this section the past season was good, although the dry, hot weather in August injured the blackberry crop to some extent.

The varieties of fruit grown were, of strawberries, Sharpless, Crescent, Capt. Jack, Mammoth, Lida, Bubach No. 5, Eureka and Haverland; of raspberries, Turner, Cuthbert, Marlboro, Brandywine and Golden Queen; of blackberries, Ancient Briton, Snyder, Stones Hardy, Erie and Taylor's Prolific.

Of the larger fruits none are grown in this section except the Transcendent crab, and that is badly affected by the blight.

The association has established an experimental station for testing the value of new small fruits for this part of the state. These experiments are under the control of a committee of three, holding one, two and three years, so only one new member can be on the committee at one time.

The interest in the meetings of the association is increasing; the attendance is better, and the outlook is bright for the future prosperity of our association

R. ELWELL, Secretary.

REPORT OF PROCEEDINGS OF OWATONNA FLORAL ASSOCIATION.

At a preliminary meeting held December 22, 1891, a committee was appointed to frame a constitution for a floral association, and report at a future meeting.

This committee reported at a meeting held at Knight's of Honor Hall, December 30, 1891.

The objects of the association will be seen by the following extracts from the constitution, which was adopted:

ARTICLE I.

This association shall be called the Owatonna Floral Association.

ARTICLE II.

The objects of this association shall be to improve its members, first in the culture of flowering plants, trees, vines, shrubbery, etc., either in the house, yard or garden; secondly, in the culture and dissemination of a proper artistic taste and tact in the arrangement of these about the home and other grounds.

ARTICLE III.

In pursuance of these objects, arrangements will be made for lectures, papers, and discussions, also for one or more floral exhibitions every year.

At a meeting held January 13th, 1892, it was decided that a regular meeting of the association should be held on the evening of the second Tuesday in each month of the year. The annual meeting will occur on the second Tuesday in August.

Any one may become a member of this association, by signing the constitution, and paying into the treasury the sum of fifty cents in advance.

The present officers, who will hold office until the next annual meeting, are

President—Dr. D. H. Roberts.
V. President—Mrs. H. R. Johnson.
Secretary—Mrs. E. P. Peterson.
Treasurer—Mrs. W. A. Sperry.

The following, in conjunction with the above officers, form the Executive Committee: Dr. J. W. Ford, Mrs. Thomas Hunter, Mrs. Lizzie Goodell.

Mrs. E. P. PETERSON, Secretary.

LIST OF MEMBERS OF THE OWATONNA FLORAL ASSOCIATION.

Dr. D. H. Roberts,
Mrs. H. R. Johnson.
Mrs. E. P. Peterson,
Mrs. W. A. Sperry,
E. H. S. Dartt,
Miss L. Austin,
Mrs. L. L. Bennett.
Mrs. J. H. McRostie,
Mrs. T. Hunter,
Mrs. I. J. Bryson,
Mrs. O. E. Parker,
Mrs. B. E. Darby.
Mrs. Lizzie Goodell,

EXPERIMENT STATIONS.

ANNUAL REPORT TO HORTICULTURAL SOCIETY FROM CENTRAL EXPERIMENT STATION, ST. ANTHONY PARK, MINNESOTA.

Members of the Minnesota Horticultural Society:

LADIES AND GENTLEMEN: I have the honor to present herewith my fourth annual report of the work of the Horticultural Department of the Experiment Station of the University of Minnesota. It being an outline of the work done during the year ending Dec. 31st, 1891.

Respectfully submitted, SAMUEL B. GREEN,
Prof. Horticulture, University of Minnesota.

St. Anthony Park, Jan. 18, 1892.

APPLES AND LARGE FRUITS.

THE RUSSIAN ORCHARD.

This orchard is doing well. It has been planted six years and now contains about 1,300 trees, representing 240 varieties. A few kinds have been seriously injured by blight the past summer and such varieties will be discarded as unworthy of further trial. The varieties that blight the worst are the Aports, generally speaking, Red Streaked, Switzer, Antonovka and Anisomooka. (?) This orchard is of much interest to horticulturists visiting the station. I have purposely witheld from publishing much about it as conclusions drawn from the behavior of apple trees that have not borne several crops of fruit are of little practical value. But as a whole the trees are thrifty and hardy, and as promising as one could wish. The land between the trees has been planted to Hubbard squash for three years. This crop pays us well. It affords a most excellent shade to the ground during the hot weather and is out of the way early in the fall, leaving the soil exposed to the sun and thus allowing the early ripening of the wood. The trees are protected from sun-scald by a slight shade of corn stalks tied on the south side, and are banked up each autumn with earth.

NEW ORCHARD.

During the fall of last year about one acre of woodland on the north slope of the hill at the station was grubbed out, and last spring it was successfully planted to a variety of fruit trees as follows: 16 varieties of Russian cherries, 2 varieties of peaches, 4 varieties of plums, 1 variety apricots and 139 varieties of apples; in all, 360 trees. The advantages of this orchard lie in the northern slope and the altitude. It supplies us with what has been long needed by furnishing us with a favorable trial ground for varieties that only do their best on elevated land.

SEEDLING APPLES.

Probably no more important work can be undertaken by my department than to experiment in raising seedling apples. With this in view I have obtained seed from various growers in the state of about fifty different

varieties of apples. These are packed in sand and will be sown in the greenhouse early in March, by which method I hope to avoid the uncertainties attending the starting of seed sown in the open ground. Many of the kinds from which seed has been saved are Russian varieties of much promise. This I believe to be a good line of work, but with these seeds we only know their maternal parent and of course the results must be largely a matter of chance. With a view to doing better and more thorough work, I have arranged to do some systematic plant breeding and crossing next spring in the fine young orchard owned by Andrew Peterson at Waconia. This will be systematic, intelligent breeding and may be likened to the methods employed to improve breeds of domestic animals and flowers.

NURSERY.

The nursery is in better condition than ever before. About two thousand apple grafts, including many new kinds of apples, have been added to our stock, besides a large collection of trees and shrubs. The coming spring I expect to plant out the roadsides about the farm school buildings with trees and plants of various kinds. The time has now arrived, since the roads have been permanently graded, when this work can be made very instructive as well as ornamental. It is my intention to have all plants so set out labeled with their common and botanical names.

FORESTRY PLANTATION.

This I referred to in my last report as having made a good season's growth. It is now in excellent condition, two years old and covers about three acres, laid out in rows eight rods long and planted with the following economic plants: European larch, white ash, black ash, green ash, box elder, wild black cherry, yellow birch, European white birch, canoe birch, American basswood, European basswood, five kinds of timber willow, six kinds of timber poplar, catalpa, butternut, black walnut, soft maple, hard maple, hemlock, red cedar, red pine, Norway spruce, black spruce, Douglas spruce and white cedar. The special value of this planting is an object lesson to our students and others in forestry, for which its value is an increasing one. It will also furnish valuable data as to comparative hardiness, rapidity and habits of growth, and the value for different purposes of newly introduced forest trees. Corn has been grown between the rows the past season to crowd the young trees and thus prevent the formation of too heavy lateral branches.

CONIFEROUS EVERGREENS FROM SEED.

The introduction of coniferous evergreens on to our wind-swept prairies is a matter of much interest. I have carried on experiments there the past two years in raising seedlings of these trees, and some of the results obtained are of much interest and value and will be found reported on at length in Bulletin No. 18, of the Central Experimental Station, which you have all probably seen and to which I will not refer at greater length except to say that they seem to show the value of a few simple precautions, which, if followed, will enable any careful man to raise these plants successfully.

Rocky Mountain Evergreens. After a careful study of these most beautiful and useful evergreens I have decided to make a specialty of raising

them from seed obtained from a high altitude on the eastern slope. With this purpose in view I have obtained seed of pinus ponderosa, abies pungens, abies Englemanii, abies concolor, pseudotsuga Douglasii, and abies sub-Alpina. Some of these kinds have already successfully stood six winters with us, among which latter are the Colorado blue spruce, the Douglas spruce and abies concolor.

GRAPES.

The grape crop has been a very good one at the station and very generally throughout the state. Owing to the favorable season, vines were very free from the injurious fungus diseases which severely injured the crops in places the previous season. Under my directions quite extensive experiments have been made at Excelsior with fungicides to protect the fruit, but on account of the favorable season no important verifications of previous results were obtained. The practice of bagging the clusters to secure fruit of the finest quality has again proven desirable. Some of the best varieties ripen much more evenly when thus protected than when left uncovered. The disadvantages are that the fruit ripens a little later and has a more tender skin. By careful management the expense of bagging grapes has been reduced to one-fourth cent per pound. Among the new varieties fruiting the past season may be mentioned the Moores Diamond. This is a white grape of high quality and I think is destined to be very popular. It ripens six days before the Concord, the skin is thick, berries large, flesh tender and juicy with but little pulp. The vine is a good grower, has healthy, thick foliage, and is withal very productive.

Wyoming Red is a very early red grape that is being largely planted in eastern vineyards, but with us it is a rather shy bearer. The berries are medium in size and pulpy. Its chief merit is its earliness. It is sometimes referred to as an early Delaware. We have now on hand forty-six (46) named kinds. Many plants of such varieties as Clinton, Bacchus, etc., we have grafted with better kinds with considerable success.

The vineyard situated on the south slope of the gravelly knoll at the station was heavily mulched last winter to protect it from washing rains and from drought, which threatened to entirely destroy it. This treatment has resulted very favorably, the vines making a fine growth and maturing their fruit and wood in most excellent condition, although we had a very severe drought in summer.

SMALL FRUIT.

The small fruit interest is yearly increasing in importance. There is a loud call for information as to the merits of the many new kinds introduced from year to year and it is an important part of the work of this department to obtain new varieties as soon as may be, and report to the public as soon as a reliable test can be made. Our collection of varieties is a large one. I do not however take any pride in having a long list of varieties for show, and it is my intention to discard any variety obtained as soon as it has been proven poorer than those we now possess. Quite an extended report was made upon the subject of small fruit in Bulletin 18. We have now on hand thirty-seven varieties of named raspberries, six varieties of named blackberries, forty-two varieties of named strawberries.

I am making a specialty of raising small fruit seedlings and have now on hand 1,600 raspberry seedlings two years old from seed of the Schaffer and Cuthbert, 400 small seedlings of the Marlboro, 400 small seedlings of the Souhegan; 50 gooseberry seedlings from the Triumph and Smith's Improved; 2,000 strawberry seedlings from Haverland and Warfield and qnite a quanity of blackberry seed for germination the coming spring. Last summer one hundred and fifty strawberry seedling fruited but as none of them showed more merit than many we now have they were discarded as I do not want to needlessly multiply varieties.

PLUMS.

Our native plum in its wild state is fast disappearing but the number of varieties that can be profitably cultivated is increasing. The outlook for improvement in this fruit is very encouraging. We have twenty-seven named varieties on trial. We are also making a specialty of raising seedling varieties and have some good seedlings from our best kinds. From these I have selected fifty of the most promising appearance for fruiting. Three pecks of plum pits of our best kinds were sown last fall. The Russian plums seem to be very hardy. The Arab is a variety of much excellence that fruited the past season with Mr. Dewain Cook, of Windom. It is of fully as good quality as the Lombard.

RUSSIAN CHERRIES.

These have not yet fruited at the station. We have had them three years and the most of them appear to be perfectly hardy. I consider them very promising.

SAND CHERRY. (*Prunus Pumila.*)

After very carefully observing this fruit I have become enthusiastic as to its future value. It varies greatly in its native state and even more under cultivation. In some of the most rigorous parts of our state it fruits regularly and heavily. The fruit is of a large size and generally quite astringent, but when cooked it makes a most excellent sauce. Some of the fruit is of a fairly good quality to eat out of hand. A peculiarity of this fruit is that it readily buds on our native plum forming pretty weeping trees that are very fruitful.

TRIAL STATIONS.

One year ago I made a proposition to you regarding the reorganization of the experiment stations of this society. The matter was favorably received and the executive committee was instructed to arrange the details of the plan. This matter has been attended to and the stations appointed. The work was necessarily delayed until the season was too far advanced for much to be done this year, but I think the plan adopted has increased the efficiency of the work, and that we will in the future see much good resulting from a closer union of interests. Some mistakes have been made which we will try to avoid in the future. It has been my intention to establish these stations so as to cover the widest extent of territory and a variety of conditions. In this I think we are reasonably successful, but there are still two sections of the state whose peculiar conditions are not represented—the great northeastern portion and the northern tiers of counties. Trial stations will be established in these localities as soon as suitable persons are found to conduct them.

Such in brief is an outline of my work in the experiment station during the past year. Other duties occupy much of my time; I give instruction in horticulture and botany in the Farm School and instruction in horticulture in the University Agricultural College course. The laying out and care of the school grounds I also have charge of.

In closing, I wish to thank the members of this society for their uniform courtesy and kindness, and the cordial support they have given me while in pursuit of my duties.

REPORT OF E. H. S. DARTT, SUPERINTENDENT OF OWATONNA TREE STATION.

Mr. President and Members:

Another mild winter and average summer has passed and all half hardy trees have done well, yet the Ohio acanthus, American sycamore, catalpa tulip tree and the kind of Russian mulberry that I have are killing down even in mild winters.

There are now growing in nursery about 13,000 trees, of which about 10,000 are apples, crab apples, cherries, plums and pears, comprising about 500 varieties; and 2,000 are evergreen trees, over twenty varieties, and about 1,000 forest and ornamental trees and shrubs, estimated at 100 varities; 1,000 marking stakes are now in use. Most of these trees are closely planted in nursery rows, and much thinning out and transplanting should be done. The fruit trees are of so many varieties, and of such uncertain value, that it is not advisable to sell any of them; besides, some have been received under restrictions.

SEEDLING APPLE TREES.

No test of a seedling apple tree is complete until it has had a fair trial as a grafted orchard tree.

On this account I am grafting a large number of new seedlings that have not yet borne fruit. Most of our trees that fail are killed by drouth of summer, or by freezing dry in winter, and since rank growers resist drouth best, and severe cold just as well, I am selecting largely of this class for further trial by grafting. Six trees of one kind (Seed. C) have made an average growth of 3 feet 8 inches from terminal bud the past season. Many others are of rank growth and fine appearance.

About 4,000 root grafts, of about 200 varieties, will be made this winter, for planting in spring. Of these about 20 varieties will be Russian, 100 new station seedlings, and the remainder the most valuable seedlings gathered from cold sections. Pedigree stock is accumulating, there being many promising seedlings from the most noted seedling and Russian varieties.

The orchard, which now contains 500 trees, is doing fairly well. There are 140 varieties of apples, about equally divided between seedlings and Russians, 15 varieties of native plums, 5 of cherries, and 3 of pears. Of the 120 trees to be added in the spring nearly all will be seedling apples.

BLIGHT—EXCESSIVE VITALITY—TREE CHOLERA.

An orchard cannot do well for any considerable length of time unless it is kept well manured. Manure produces, or at least induces, blight. Blight, though contagious, does not affect all varieties alike, some being so nearly free from it, even when subjected to high culture and exposed to other blighted trees, that they receive little injury, whilst others seem predisposed to blight to such an extent as to be of no value whatever. There are all gradations between these two extremes.

The Russians are said to be great blighters; so also are seedling varieties, especially those of crab origin, and Mr. Gideon thinks we will find no apple hardy enough for Minnesota, unless there is in it an infusion of the crab. I think Mr. Gideon is right, but this crab infusion has been coming without our knowledge or consent. Every apple seedling is a cross; and as crab apples abound everywhere in Minnesota, and as bees are always busy carrying pollen in its season, we cannot escape the crab infusion. We may try hand pollenization, but here heredity may step in and upset our calculation. One or both parents may have been infused. The two races are mixed, and we could not separate them if we would, and we would not if we could, for herein is our road to success. We may conclude, therefore, that all our apples are liable to blight. And it would seem best that on all our experiment stations blight should be encouraged, and that all varieties showing strong tendencies in that direction should be consigned to the brush pile. An exception should be made in favor of such varieties as the Wealthy, which, though liable to blight, approaches perfection in all other respects except hardiness. Such trees should be manured but lightly in orchard if stable manure is used and may be treated with remedial applications when such applications become known.

The following varieties have been seriously injured by blight the past season, and most of them will be destroyed together with many unnamed seedlings:

Russians.—Antonovka, Lowland Raspberry, Yellow Anis, Red Transparent, Orel III, Anisouka, Thaler.

Seedlings.—London Pippin, Hutchinson's Sweet, Wisconsin Chief, Brier's Sweet, Tubbs Ironclad, Dartts Hyb. Seed. No. 4, General Grant, Meneray, Barrs Siberian, Wealthy, Beechs Sweet, Yellow Transcendent, Dartts Porch, Lake Winter, Homestead, Arnolds Winter, Quaker Beauty, Red Bark Crab.

The Apple Question.—Since the disasters of 1884-5, our society seems to have turned away from the apple question to more salubrious fields, just as the boy in school sometimes turns with disgust from the problem he cannot solve. The revision of our fruit list has received but little attention, and its discussion has sometimes been dispensed with. There is no way by which the merits and demerits of a variety can be so quickly established, and by which the most important questions relating to methods can be settled so well, as to bring them before a body of practical orchardists and experimenters, who know whereof they speak.

At this time, when nine-tenths of our farmers believe that it is best to bring their barrels of apples around through the wheat field or hog pasture, or by way of the cheese factory or creamery, it would seem most becoming for our society to dispense with enough attractive features to en-

able it to devote at least one full day of three sessions to the apple question at its next winter meeting.

Improvements—Cut worms.—The permanent improvements of the year are the erection of a small building 12 x 18 feet for workshop and storage at a cost of $75, and the obtaining of a water supply by laying pipes from the standpipe, or reservoir of state school, at an expense to the station, including hose, of $61.55. Fully two-thirds of the total expense was borne by the state school board. This water supply, which is sufficient for irrigation in a very small way, will be of great advantage. I had been fighting cut worms in the rows of growing apple seedlings unsuccessfully. Had tried the placing of little bunches of green branches of trees along the rows, but few worms sought shelter under them. When the ground is wet they seek surface shelter, but when it is dry worms seem to prefer burrowing in the ground and are hard to find. A little bank of earth was raised on each side of seed rows and water was turned on. This brought many worms to the surface and I have reason to think some were drowned.

Surplus Stock—On the 25th of April, 1891, a box was shipped, without charge, to the St. Cloud Reformatory, containing 60 fruit, shade and ornamental trees, and a similar box, omiting fruit trees, was sent to the State Fair grounds. There are now many trees that could be spared for state institutions and experiment stations, and though no improvements of consequence are now needed, and purchase of additional stock may be dispensed with, yet the amount of labor required increases each year with the increase of stock, and if the additional expense of digging, packing and shipping trees is incurred, the $200 per annum now allowed for all expenses (except salary) will be inadequate.

Last Report—One thousand copies of my last report were printed at an expense of $10. Some of these were sent out by mail but most of them were distributed by Mr. Somerville at the Farmers' Institute. Supt. Gregg and Mr. Somerville expressed the opinion that I could not use $10 to better advantage than to procure another thousand copies for such distribution, which was done.

Thanks are due to the following persons for contributions of trees and shrubs: Jewell Nursery Company, Lake City; C. W. H. Heideman, New Ulm; Silas Hillman, Kasson; Andrew Peterson, Waconia; A. Gates, Berlin; S. D. Richardson, Winnebago City.

We are under especial obligations to A. W. Sias, of Pueblo, Col., for recent favors and for past liberal contributions.

E. H. S. DARTT.

RUSSIAN APPLES.

A. PETERSON.

WACONIA, MINN., Dec. 15. '91.

My record will mostly be about Russian apples, as I have tried over a hundred varieties of them. In the first place I will tell about the hardiest and those that blight very little. I begin with the Christmas apple, which I call a very hardy tree; the tree don't blight; it is now eighteen years old. A few years ago it was sun scalded because the tree was lean-

ing too much to the north, but it is healing over now, and any hardy tree will get sun scalded when it leans too far to the north. The fruit is middling large and keeps up to January and has a good flavor for an eating apple. The Plikanaff is hardy and will stand any severe winter; a late fall apple of same size as the Duchess, but of better flavor. The tree blights some, but not badly.

The Lieby, most of you know, the trees and the fruit, too. It blights some on new wood but never severely, and the tree is the hardiest of all the Russians.

The Hibernal, from the Department in Washington, I call the same as the Lieby. If there is any one that has had the Hibernal from the Department, I should like to know it; the Hibernal I got from Prof. Budd is another kind in leaves and trees.

The Charlamoff most of you know of, both trees and fruit. It is one of the best eating apples of all the Russians; it blights some, but at my place it is a good deal hardier than the Duchess.

The Ostrekoff Glass, from the Department, is just as hardy as the Lieby, and the trees and the fruit are the same. I can not see any difference, except it keeps a little longer.

22m; Blushed Calville, is a very hardy tree, but blights some; a good and early bearer with a handsome and good flavored fruit, the same season as the Duchess.

The Cross apple is a very hardy tree and don't blight any; the fruit is the same size as Lieby, but better flavored and keeps until January.

No. 9m; English Barovinka: the name is a mistake, it must be 245 Barovinka. The trees and leaves are like the Duchess and fruit the same but better flavored and keeps longer. I shall plant them instead of the Duchess.

387, Good Peasant: this is a hardy tree and don't blight much; the fruit is middling size with good flavor, keeps until January and some later.

4m; Ostrekoff Glass: this is a good deal different from that from the Department. The tree is hardy enough for any severe winter, but blights some. When I mention the blighting on so many kinds, I will say that I think it depends on that I had too deep cultivation among the trees for several years; because I have have had sugar beets planted among the trees, and they require deep cultivation; but last spring I seeded half of the orchard with Alfalfa clover and on that part there was hardly any blight last summer.

28m; Kluevsko: a late fall apple;the tree is hardy but blights some; tolerablly arge fruit with good flavor.

14m; Annismovka: fruit middling size, a handsome apple and of good flavor. Two years ago it blighted very badly, but last summer it didn't blight any at all.

5m; Royal Table. This valuable tree I am sorry to say has blighted too much for two years back; last summer it blighted very little but its location is very bad, it is south of the granary; so I shall have to try them on another place because this Royal Table keeps up to April and longer. Prof. John Craig says that it don't blight in Canada, and according to his report any tree is true to the name.

406, Saccharine: is a hardy tree and don't blight any; had fruit two seasons of medium size. The quality is good but there is no saccharine in it. It is sour as the Duchess, so the number and name is a mistake—it is from the Department.

These fruits that I now have mentioned I have fruited, so I know what they are and know how long they keep.

The Grandmother, Red Ripka and 3m Lead apple: these are nine years old, but have not fruited them yet as they are late bearers, but the trees are hardy and don't blight any. Of small trees I could mention about fifty varieties more, but it is no use, because I don't know how they will come out.

Of the five varieties of seedlings I got from C. G. Patten, Charles City, Iowa, those he called the Pattens Greening are the best. It is hardy and don't blight any at all; the fruit is tolerable large with good flavor and keeps until Christmas.

Those I call the Wolfs Seedling has fruit of a middling size and the quality is very good, and it keeps up to April, but I am sorry to say that the tree is not hardy for winter, as it don't blight any. In my judgment it must be a cross from Rawles Janet and Fameuse; the tree and leaves are Rawles Janet but the flavor is Fameuse. Anyhow, the tree is hardier than the Rawles Janet for winter. My own seedling has not fruited any yet but I hope it will next summer.

Last spring we had a good deal of trouble with the leaf-worms (or caterpillars) in our neighborhood. I took several bushels of them. I tried a good many ways to keep them from the trees but the best of all was to tie wool around the trees; they couldn't crawl over that because they were too short-legged. Next spring it will be the same because the wood is full of eggs in the orchard. I have picked lots of eggs this fall. Another enemy that we are troubled with here is the rabbits; they did me a great deal of damage last winter. I wish our society would ask the legislature next session to give bounty on the rabbits the same as on wolves.

Of the Peerless apple trees I have to say that they looked hardy. I top-grafted a couple of hundred of the Peerless on three year old Lieby stock and they grew splendidly; they didn't mind the winter and don't blight any. I think that they will be the trees for Minnesota in the future.

I have a few varieties of plum trees. In the spring they showed a good deal of fruit on them, but the caterpillars took it all. So they did with all the leaves on the raspberries, but they blossomed anyway and there came new leaves again, so we had as good crop as ever of raspberries.

Of strawberries we had a very good crop last season.

In Prof. S. B. Green's report in "F. S. and Home" of Sept. 15, '91, is a little mistake. He says I commenced selling apple trees in 1872. I think he misunderstood me when I said I planted the first Russian apple tree 18 years ago. I commenced planting apple grafts in 1856. That spring I planted a thousand—bought from Neills nursery, Burlington, Iowa, the same nursery that I worked in before, and in 1857, I bought another thousand grafts, altogether about 50 or 60 varieties, and of all these there were only the Fameuse, Rawles Janet and Pumpkin Sweet I could grow big enough for bearing, and they bore a good crop for a few years, but then they died.

Yours respectfully,

ANDREW PETERSON.

REPORT OF EXPERIMENT STATION AT ALBERT LEA.

CLARENCE WEDGE, SUPT.

This station was established March 20, 1891, upon what is known as Echo Farm, one mile southeast of the city of Albert Lea, and upon the south shore of Lake Albert Lea. The soil is a clay loam, the geological formation a moraine of yellow clay with gravel and hard heads. The ground was originally covered with scattering burr oaks and hazel, and seems especially adapted to wheat, clover and blue grass. On account of its situation near the lake, and its elevation above the same (about 60 feet), there is an unusual freedom from early and late frosts. The station was established so short a time before planting time that little was attempted the past season, and this report will mainly be a summary of experience since planting was begun on the premises, some eighteen years ago. A large and valuable list of trees ordered from the Iowa Agr i cultural College, for planting last spring, was not received on account of their inability to fill orders within the unusually short delivery season. About fifteen varieties of apples from C. G. Patten, of Charles City, Iowa, were received, all in leaf, and were set with small hopes of their living, but they were severely cut back and all leaves rubbed off, and in the end they lived and made about as good growth as earlier set trees.

THE APPLE.

A complete report is given on next page of experience in the apple orchard since 1874. The situation of said orchard is moderately sheltered on the north and west. Among the earlier trees set were two Hyslop and two Transcendent, all of which grew to good size, bore considerable fruit and died of blight. The orchard has never been in grass or clover, but the space between the trees has been used for garden and small fruits, and it is worthy of notice that the best trees of the Wealthy of the fifteen set in 1880, are the six on either side of an asparagus bed that yearly receives a heavy coating of manure.

In the spring of '91, fifty acres adjoining the old farm on the west was purchased and the planting of a new orchard began. The situation of this new orchard is on the south shore of the lake and wholly without shelter except from the home grounds on the east. The rows are laid out north and south, forty feet apart. Trees in the experiment rows are set eight feet apart and in the orchard rows (mostly Hibernal) twelve feet apart. A heavy crop of oats was grown between the rows the past season. The following varieties were received from Patten and set in above experiment row:

Arabian.
Peter.
Orange Winter.
Tallman Sweet.
Antemoka.
Melinda.
Wolf River.
Romna.
Muscatel Rainet.
Haas.
Romenska.
Juicy Burr.
Arthur.
Red Transparent.
Howards Best.

TABLE ACCOMPANYING REPORT OF CLARENCE WEDGE.

VARIETY OF APPLE.	When planted.	Number planted.	Who from.	Number dead.	Year died.	Blight.	Sunscald.	Present condition.	First fruited.	Bearing.	Size of fruit.	Quality.	Season.	Remarks.
Duchess	1874	1				No	No	Perfect		Heavy	Large	Acid, good	Sept.	A perfect tree in this section.
Wealthy	1880	15	Home Nurs'y.	5	85-6	Serio'sly	Badly.	Pretty good		Excel'nt	Large	Best	Jan.	Should be set leaning to s. w.
Briar Sweet	1883	2	E. Wilcox			No	No	Perfect	1890	Good	Of Hyslop	Sweet, good	Sept.	A v. desirable crab.
Whitney	1883	2	E. Wilcox			No	No	Perfect	1890	Fair	Of Hyslop	Pleasant dessert	Sept.	One of our best.
Charlamoff	1885	1	C. Luedloff			No	No	Perfect	1890	Good	Large to v. large.	Better than Duch's	Sept.	Very promising.
Veron. Rein'te(282)	1885	3	Prof. Budd			No	No	Perfect	1890	Fair	Medium	Pretty good	Jan.	A very fine tree.
Antonovka	1885	3	Prof. Budd.	2	1888	Bark blt	No	Perfect	No					
Recumbent	1889	5	C. G. Patten			No	No	Perfect	No					
Czars Thorn	1885	2	Prof. Budd			No	No	Good	1890	Heavy	Large to very large.	Sweet, fine	Sep.1	Season of fruit before Duchess; tree not very thrifty.
Ostrekoff (4 m)	1886	1	Prof. Budd					Perfect	No				[Oct. to No	Tree, for some reason, very unthrifty until 1890.
Martha	1881	1	Cook, R'chst'r			No	No	Perfect	1890	Good	Large crab	Fine culinary		Tree extra fine.
Tetofsky	1880	2	Home Nurs'y.			No	Some	Pretty good	1889	Very pr.	Medium	Very pleasant.	Aug.	
Elgin Beauty	1881	1	Cook, R'chst'r			Some	No	Good	1890	Good	Small	Fair dessert	Jan.	
Maiden Blush	1883	2	E. Wilcox			Serio'sly	No	Pretty good	1890	Mod'r'te	Of Transcendent	Very good dessert.	Jan.	Not profitable.
White Transpr'n't	1887	5	A. G. Tuttle	3	1888	Very badly.	No	Perfect	1890		Medium	Good	Aug.	Three trees blighted to death.
Cross (True)	1889	3	C. G. Patten			No	No	Perfect	1891	Heavy	Medium to large	Good	Winter	Remark bly early bearers.
Longfield	1887	10	A. G. Tuttle	6	1888	No	No	Perfect	1890	Heavy	Below medium	Excellent dessert	Jan.	New set trees could not stand winter of 1887-88.
Hibernal	1887	3	A. G. Tuttle			No	No	Perfect	1890	Heavy	Large to very large.	Excellent kitchen.	Dec. to Ja.	Tree very vigorous and healthy.
Patten's Greening	1890	5	C. G. Patten			No	No	Perfect	No					Crooked grower
Long Arcad	1887	1	A. G. Tuttle			No	No	Perfect	No					Tree very upright; has twice set fruit.
Blue Anis	1887	2	A. G. Tuttle			No	No	Good	No					Slow grower.
Vargul	1887	2	A. G. Tuttle			No	No	Perfect	No					Set fruit 1891.
Barloff	1887	5	A. G. Tuttle			Some	No	Perfect	1890		Specimens large.	Sweet, good	Oct.	
Repka Malenka	1887	10	A. G. Tuttle	2	1888	No	No	About pfct.	No					Winter of 1887-88 injured the new set trees.
Richl'nd Winter,s.	1890	2	Patten			No	No	Perfect						
Striped Anis	1890	1	Patten			No	No	Rather poor	No					Tree not thrifty.
Good Peasant	1890	2	Patten			No	No	Fine						May prove to be Longfield.
Wealthy	1890	3	Patten			No	No	Perfect						Put in for comparison.
Roman Stem	1890	1	Patten.			No	No	Perfect						Top worked in Va.

The Russian and American varieties were mixed as above for a comparison of merit. There were also planted in the old orchard the following varieties:

Peerless.
Cross (413).
Minnesota Crab.
Christmas.
Charlamoff.

THE PEAR.

Two trees of the Kurskaya, 392, planted in 1885, had a few blossoms last spring and are now full of fruit buds. The trees are in perfect condition and have never shown blight. Trees of Nos. 439 and 481, set at same time, are now dead, and one tree of 508 that was killed to the ground some years ago has sent up a strong shoot.

THE PEACH.

About 24 trees set in 1889 and 1890 have passed two winters in fair condition. They were generally covered with marsh hay. This winter we have them covered about two feet deep with corn stalks. The varieties planted are:

President,
Waterloo,
Amelia,
Mountain Rose,
Troths Early Red,
Stump the World.

THE PLUM.

Five trees of the Desota planted in 1882 have borne excellent and regular crops since 1887. Ten trees of the Forest Garden set about 1885 bore their first good crop the past season. With us they are rapid, upright growers; fruit moderately abundant, full as large as Desota; when ripe, very sweet, juicy, soft and perishable; pit, nearly twice the size of Desota. A tree of native variety received from Chas. Luedloff about 1885 bore first crop this season; fruit abundant, ripe before Forest Garden, smaller than Desota, fairly firm, pit small, skin disappears in cooking, which latter fact constitutes its main value. Have planted in orchard the past season the following varieties:

Rockford,
Cheney,
Wolf,
Morrison's Peach.

THE CHERRY.

Five trees of what is known as Minnesota Osthiem, set in 1885, have borne specimen cherries for several years. The trees are perfectly healthy, but the fruit of small size and low quality.

SHRUBS PLANTED.

Juneberry (success),
Hydrangea, P. G.
Mock Orange.
Spirea, V. H.
High Bush Cranberry.
Strawberry Tree.
White Lilac.

EXPERIMENT STATION FOR GRAPE VINES, EXCELSIOR, MINNESOTA.

CHAS. W. SAMPSON, SUPERINTENDENT.

Vines received in good order, except one Eaton, which was a poor vine. I set them out about the 10th of May and watered them, it being very dry. They all made a very fair growth of vine, some of them growing five or six feet. I set them on elevated ground, sloping to the south. The soil a sandy loam with clay subsoil. I covered them this fall with earth, putting straw manure around the roots. I am very much pleased with the growth they made this season. The following kinds have made a good growth: Dracut Amber, Moyer, Eaton, Mills, Woodruff Red, Eldorado, Green Mountain, Telegraph and Rockwood.

I hope to make you an excellent report next year.

REPORT OF EXPERIMENT STATION, MINNESOTA CITY, FOR THE YEAR ENDING JANUARY 31, 1891.

O. M. LORD, SUPERINTENDENT.

To S. B. Green, Horticulturist State University, St. Anthony Park, Minn.:

Stock received spring of 1891.

Cherry trees—5 Frauend offer Weischel, 3 Orel (24), 3 Riga (109), 3 Strauss, 3 Giotte Dumond, 3 Orel (23), 2 Brus Braume, 3 Orel (27), 2 Kings Amarell, 3 Shadno Amarell, 3 Besarabran, 3 Riga (108), 3 Lutovka, 3 Double Natte, 3 Sklanka, 3 Orel (25).

Currants—2 Black Russian.

Plums—2 Voronesh Yellow, 2 White Nicholas, 2 Richland, 3 Hungarian.

Grapes. 2 Kansas.

Raspberries. 1 Wineberry.

Growing experimentally from last year's setting—

Two pear trees (Bessemianca)

Strawberries. Princess, Warfield, Bubach.

Plums. Wyant, Knudson's Peach, Homestead City, Bean, Heideman's New Ulm, also some scions of Yosemite, Kelsey, Botan, Sheuse and Satsuma. There are several varieties of native plums upon the ground that may be considered long past the experimental stage; also grapes, such as Concord, Delaware, Iona, Moore's Early, Wordon and Agawam.

Blackberries. Ancient Briton, Snyder, Stone's Hardy, Taylor and Early Harvest.

Raspberries. Philadelphia, Turner, Cuthbert, Shaffer, Gregg and Taylor.

Strawberries. Crescent, Jessie, Downer's Prolific, Capt Jack and Manchester.

All these fruits have been grown here for a series of years and have proved to be adapted to the soil and climate.

After a careful and painstaking trial of four years, I have discarded the dewberries, as not adapted to my soil, though occasionally wild ones grow in this vicinity and produce abundantly.

Apples. No apple trees have been set within the last three years. The leaf or twig blight has materially damaged what are standing, which in-

clude a few Russians, 200 Wealthy, 100 Fameuse and G. Russet and a few Duchess and crab trees.

Since the appointment of this experiment station more special attention has been given to native plums than to any other fruit; and the results of the last year tend to confirm the opinion that a more general knowledge of their character and habits is very desirable, and that they will bountifully respond to cultivation and well repay for all trouble and expense, whether for home use or for the city markets. There are now on the grounds fifty or more varieties, thirty of which are in bearing. With the consent and co-operation of the central station these experiments will be made a specialty in the future as in the past.

DISCUSSION.

Mr. Harris: Mr. Lord first called my attention to his Rollingstone plum a great many years ago, and ever since that I have taken every opportunity that presented itself to inform him of new varieties. While the Rollingstone plum is probably the plum that most people would prefer because of its fine eating qualities; still, Mr. Lord does not claim that it is the best variety for all purposes. I have no doubt but that it is a valuable acquisition for the people of Minnesota, as from what I have seen of it in other places, it seems to be doing well in other parts of the state.

Mr. Lord: I would like to emphasise this statement of Mr. Harris in regard to its being a valuable acquisition to our native fruit. I have received many expressions of that kind from the United States Pomologist, Mr. Van Deman; and from Mr. Rogers, well known throughout the United States; and from a man who is now dead, Mr. Gibbs of Ontario; and from different persons in Michigan. Also from Prof. Bailey, from Secretary C. W. Garfield of the American Society in Ohio, from several parties in Illinois, Secretary Regan of Indiana, and from numerous places in Wisconsin, Colorado and Iowa.

Mr. Harris: This is a valuable acquisition, as I said before. Mr. Lord believes that we have other natives that will also become valuable. One of the most important things about this plum in question is the length of time it will keep after it ripens. It can be shipped from here to New York with a certainty of its arriving there in excellent condition. That cannot be said of nine out of ten of our natives.

Dr. Frisselle: Are they better than the Desota plum?

Mr. Lord: They are a better eating plum, but I do not suppose they are any better when cooked. The skin peels off this plum as easily as you would peel a boiled potato. It has more solid meat than any other plum, and is of a very delicious flavor.

REPORT OF EXPERIMENT STATION, NEW ULM, MINNESOTA.

C. W. H. HEIDEMAN, SUPERINTENDENT.

New Ulm, Minn., Dec. 23d, 1891.

Sam'l B. Green, Esq., Horticulturist:

DEAR SIR:—I herewith submit to you and through you (such parts thereof as you see fit) to the Minnesota State Horticultural Society a report of my experimentation at this station during the past year. Most of the experiments which I have commenced will require from 5 to 10 years before any definite results can be reported, and are for the most part rather more of a scientific nature, although as a matter of choice my subjects are all of a horticultural nature, and any information which my experiments may evolve may be of interest and value to the horticulturist of the extreme northwest.

My principal study has been and will continue to be

First: "Acclimitization," "Modification of plants by climate," "Characteristics of hardiness in plants" and generally investigation and study of all the phenomena relating to or bearing in any way upon constitutional hardiness of plants.

Second: To determine the laws which govern the transmission of hereditary and other characteristics, including the laws of prepotency of male and female parents in transmitting and reproducing characteristics hereditary, or variations.

Third: Experiments in budding, grafting, crossing and hybridizing to determine the affinities of various species and varieties; effect of stock upon scion and effect of scion on stock.

Fourth: Improvement by selection of our most promising native fruits, etc.

The most satisfactory experiment I have yet undertaken is the winter protection of tender roses and other plants, generally considered too tender to withstand our severe winters, even with the most careful covering.

I believe the discovery of much importance to horticulturists of the northwest, and worthy of more extended investigation and experiment by experiment stations, having better facilities and a more varied stock of plants than private individuals with only small grounds and limited means.

My method is, just before winter sets in, or about the time I usually cover my grapes and hardy roses, to spread an old gunny sack on the ground and around the plant; on this put three or four inches of locomotive cinders; then lay the branches on this and peg down to hold them; then over all lay a covering 3 or 4 inches of the cinders, carefully lapping the bagging to hold the cinders in place. Over this put 3 or 4 inches of ordinary garden soil, and the plant is reasonably secure. The object of the bagging is to confine the cinders where needed and to remove them from the bed in spring. The cinders as they come from the locomotive are a perfect absorbent, and this combined with their non-conducting qualities make them the best of material for covering any plant which requires or

is benefited by protection from repeated freezing and thawing in fall and spring. By the above method I have successfully wintered out of doors, heliotrope, fuchsia and tender tea roses.

Experiment will surely enlarge the list of plants now considered too tender to winter out of doors.

BUDDING SAND CHERRY ON PLUM STOCK.

For the purpose of determining the affinity between the botanical varieties *Prunus Americana* and *Prunus pumila*, during August, 1889, I inserted buds of a sand cherry which had grown on my grounds for several years without any sign of fruit. The buds "took" and during the season of 1890 made vigorous growth, and by fall were loaded with fruit buds, and the past year fruited heavily. So far the union appears perfect, the growth being vigorous, the foliage reaching almost thrice the normal size and quite distinct.

IMPROVING ASTRAGALUS CARYOCARPUS.

This plant is frequently found on our prairies, and commonly called "ground plum." In the "Flora of Minnesota" is found the following note upon this species, by J. C. Arthur: "When the pods, which are nearly solid, have reached the size of hazel nuts, they prove a valuable addition to the list of early vegetables. Cooked like green peas, they make a pleasing dish, intermediate in taste and flavor between early peas and asparagus." I know of no native plant which offers to experimenters such opportunities to develop its qualities, possessing as it does in its wild state almost every quality desirable to make it a popular and profitable vegetable.

It is perennial, perfectly hardy, prolific and palatable; at least two or three weeks earlier in season than our earliest peas.

I now have seedlings from selected wild plants, that already show improvement in size (½ to 1 inch in diameter) of almost solid flesh, and that give fair promise to do well under garden culture.

Respectfully,

C. W. H. HEIDEMAN,

Superintendent.

Mr. Underwood: I hope that Mr. Heideman's modesty won't stand in the way of his coming here and giving us such valuable information in the future. I shall turn to the pages of our annual report that contains this paper with a great deal of interest.

Dr. Frisselle: Had your grounds any special protection by reason of forests or any thing of that kind?

Mr. Heideman: No sir. I am confident that this same success in the use of the cinders can be had anywhere in Minnesota or Dakota.

DISCUSSION.

Mr. Underwood: It seems to me that we ought to express our approval and admiration of the work that Mr. Heideman is doing as illustrated in his paper.

Mr. Heideman: I wish to enlarge upon the matter of protection of tender plants. I have successfully wintered at least one dozen varieties of the tender tea roses, such as the Marshal Niel, and all the hybrid teas, and I have 35 or 40 varieties of roses. I have used these cinders as a covering and never lost one. Prior to that time when the season had been satisfactory and favorable, when we had an early snow that remained on the ground, and the spring opened up all right, I had wintered tea roses under such circumstances, without this protection, by simply covering up and packing them down. A simple way of ascertaining the value of the cinders is to place them on a spot of ground before the frost sets in, and if you remove them after a hard frost you will find that they have acted as a non-conductor. Another advantage of their use is the fact that they give a free access of air and there is consequently no smothering. I have wintered the heliotrope with the foliage and blossoms on, and next spring they came out and went on blossoming.

ST. CLOUD EXPERIMENT STATION.

D. E. MYERS, SUPERINTENDENT.

MINNESOTA STATE REFORMATORY,
ST. CLOUD, MINN., Dec. 29th, 1891.

Prof. Samuel B. Green, State Horticulturist, St. Anthony Park, Minn.

DEAR SIR:—I hereby report to you the number of different kinds of plants on the grounds of this institution, most of which were set out during the present year. The seven thousand strawberry plants, set out a year ago last spring, produced five hundred and eight quarts of berries and are in first class condition for another year. Hon. E. H. S. Dart, superintendent of the State Experimental Station at Owatonna, Minn., last spring sent me twenty evergreen and fifty apple trees. The apple trees are all living and doing finely, but about two-thirds of the evergreens died last summer, on account of the severe drouth, our water supply not being sufficient to water them properly. Next spring I expect to set out from three to four more acres of strawberries, also an apple orchard of three hundred to four hundred trees.

I will note and report to you in my next annual report the condition of everything in the horticultural department, also the productions thereof.

Respectfully yours,

D. E. MYERS.

PLANTS SET OUT AT MINNESOTA STATE REFORMATORY, FOR YEAR ENDING DEC. 31, 1891.

7,000 strawberry plants.
50 apple trees.
20 evergreen trees.

Grape vines—20 White Ann Arbor, 20 Oneida, 5 Moore's Diamond, 10 Agamemnon, 10 August Giant, 30 Concord, 5 Francis B. Hayes, 20 Jefferson, 10 Martha, 30 Moore's Early, 10 Brighton, 10 Worden.

Raspberry Plants—2,000 Crimson Beauties, 5,000 Cuthberts, 100 Gregg, 100 Yellow, 2,300 Cuthbert, 100 Turner, 100 Eureka.

Currants—200 Red Dutch, 100 Fays Prolific.

Rhubarb—12 (kind unkown).

REMARKS.

Prof. S. B. Green: This station is at the St. Cloud Reformatory, and is carried on by convicts. It forms one of the best opportunities we have for pursuing work. The location is most admirable, and it is a place where we have never had much experiment work carried on. The land is high and rolling, and is a most admirable situation for orchards. I understand that they are going to put out three or four acres next spring. Although the work has largely been preparatory so far, I think it is one of the best places that we have to have the work cared for. While Mr. Myers' report is not very long this year and is practically confined to what they have raised on the place, yet the work that he is doing is valuable, and the outlook is very promising.

WINDOM EXPERIMENT STATION REPORT.

BY DEWAIN COOK, SUPT.

APPLES.

Of Russians, some seventy varieties are mostly doing finely; a few varieties are beginning to bear. They are free growers and do not kill back any, that is those that have been set only four or five years, or since the hard winters, so it is a difficult matter to teli what varieties will succeed and what will fail.

Of other varieties of apples and crabs I have quite a long list. My Hyslops and Transcendents have blighted to death leaving only a few specimens; the Beechers Sweet killed with blight without producing any fruit; the Minnesota appears very hardy, and no blight; the Early Strawberry is a strong grower and free from blight: the Virginia crab is very promising, is a rank grower, absolutely hardy and thus far free from blight; the Wealthy and Duchess are the popular apples here, the Wealthy blights a little in the twigs.

Of the newer varieties, the Okabena, two trees set spring of '89, are doing finely. It makes a strong, healthy growth, has fine foliage, and is one of the few varieties that ripens up its new growth perfectly. The Peerless, set spring '91, grew vigorously from the start; it has a large, healthy leaf. So far I am well pleased with it.

CHERRIES.

The Early Richmond is producing some good crops. I have quite a variety of Russian cherries, most of which have fruited, seem rather poor growers and bear very little. The Cerisa De Osthiem is the most promising, but we have Russian seedling cherries that are better growers, better bearers, and produce better fruit than any of them.

RUSSIAN PEARS

These are very promising, and I have about come to the conclusion, that, if the blight don't take the trees, we can grow the Russian pears as well as we can grow apples. They are very strong growers, seem perfectly hardy, every twig growing from the topmost bud. My pear trees were mostly set the spring of '86. The Tonkevirthka, Victorina and Lemon are especially promising. The Bessamanka has about gone with blight. They were close to my Transcendents. 392 Kruskaye is the weakest grower of them all. The Russian Germans here are growing a pear they call Kruskaye. It is the wild pear of Russia and blights badly. It is very thorny and is altogether distinct from the 392 sent out by Prof. Budd.

RUSSIAN PLUMS.

I have several varieties of Russian plums. The Arab, Russian No. 3, and Early Red Russ seem to stand our recent mild winters fairly well, and may be of some value for our southern counties.

NATIVE PLUMS.

All varieties, both cultivated and wild, bore heavily. For dessert, the Rollingstone was in the greatest demand. The Speer is perhaps the best in my list for canning. The plum is undersized and is a poor dessert plum. The Wolf is large and fine, and very firm. The Desota should take first place as a general purpose plum, but it does not seem to stand drouth as well as some of the others. The Forest Garden is a grand success, is a heavy and annual bearer, about ten days earlier than the Desota. The fruit cracks and does not keep well after getting ripe, and for that reason I do not like it for market; flesh is very rich, and has a strong syrup flavor. Our best varieties of native plums should be more generally planted.

STRAWBERRIES.

I am not testing many varieties of strawberries. The Manchester, Greens Prolific, Bidwell, James Vicks Jewel, and several other varieties have failed with me. If I was to grow only one variety, it would be the Downers Prolific. The Crescent does finely fertilized by Downers Prolific. I am expecting much from Warfield No. 2 and Haverland.

RED RASPBERRIES.

I have a pretty long list of these. The Shaffers Collossal I shall discard. The canes winter kill; it is very difficult to give them winter protection; the roots are very near the surface and do not stand drouth well. The Caroline (yellow) is also a worthless berry; I can neither sell the fruit, nor get any one to eat it. The Turner is hardy, (as a rule all our red raspberries rarely need winter protection here) early, and best quality, the best single variety for home use. The canes of the Turner seem to be infested more by the snowy cricket than any other variety. The Marlboro is as hardy as the Turner, rather a slow grower, immensely productive, of very large, firm, bright red berries of about third rate quality; valuable for

early market; season same as Turner. Superb is another bright red berry, very large, of fine flavor, season medium. Brandywine proves very hardy, and a sure cropper. The Cuthbert, though not quite as hardy as some of the others, stands our recent mild winters very well without protection, and the past season was the most profitable red raspberry I grew.

BLACK RASPBERRIES,

These are more liable to root injury than the reds and should be grown in a location where the snow does not blow off the ground. I have tested and discarded several varieties so far. I consider the Souhegan the most valuable black cap; cane is healthy, very productive, fruit large and fine-flavored. The Gregg should be grown for late in connection with the Souhegan. It is large, fine and productive. Black caps as a rule are not as hardy as the reds, and should be bent to the ground in fall, and tops covered for winter protection.

CURRANTS.

Red Dutch, White Grape, Victoria, and Long Bunch Holland are doing finely. Fays is a very slow grower, fruit very large and not very productive.

JUNEBERRY,

or Rocky Mountain huckleberry, is perfectly hardy, and is very productive. Plant bears when very small; bush grows about the size of a current bush.

GRAPES

Seem to require a great deal of winter protection on black prairie soil. The Concord is our most successful variety; the Moores Early is very hardy but is not very productive; the Worden is a strong grower, very productive and fruit of fine quality, but it lacks hardiness and must have more winter protection than the Moores Early or Concord; the Delaware I think hardier than the Worden, it is free from disease, as are all my grapes. Janesville is very hardy and productive but of poor quality, it is very early; the Champion is a strong grower, is early and productive but lacks hardiness; the Martha is a hardy white grape, good quality and hardy; Brighton is a fine, brown grape, extra quality, but rather tender.

RUSSIAN POPLARS

Of about a dozen varieties only one of them near equals the cottonwood in growth, and that one is Pop. Pyramidillas Pastgeha. This poplar resembles the worthless Lombardy very much. There may be some of the Russian poplars valuable for planting on our prairies, but I doubt it. Pop. Bercolensis is a positive failure; my twelve trees all died in about three years apparantly of old age—they all root-killed. Some other varieties plainly show weaknesses that will make them worthless for this section.

RUSSIAN WILLOWS.

I am more favorably impressed with these willows than I am with the poplars. Salix Argentea and Salix Vittelina Britonenses killed out by cold. Salix Lanifolia is a fine willow, ornamental and rapid growing, foliage exempt from attacks of the willow worm. Salix Aurea or golden willow I consider valuable; it is ornamental in winter and a very rapid grower. Salix Acentifolia is a fine ornamental willow with blue bloom on new growth; foliage free from attacks of insect enemies.

The following table shows the tabulative data in connection with my experiment work:

TABLES ACCOMPANYING REPORT OF DEWAIN COOK.

VARIETIES.	Date of vegetating.	Date of blooming.	Date of first ripe fruit.	Date of first picking.	Average diameter.	Average weight (ounces).	Average weight of bunch (ounces).	Quality (scale 0 to 10).	Firmness (scale 0 to 10).	Value for market (scale 0 to 10).	Value for home use (scale 0 to 10).	Vigor (scale 0 to 10).	Hardiness (scale 0 to 10).	Productiveness (scale 0 to 10).	General appearance (scale 0 to 10).	Rate of yield per acre or sq. rod.	Remarks.
Plums.		May.	Sept.														
Desota	..	12	16	.....	..	..	..	..	..	10	10	7	10	9	8	..	Tree very hardy, a regular bearer, fruit of uneven size.
Forest Garden	..	11	8	.....	..	..	..	..	..	8	7	10	10	10	9	..	Rich flavor but not a good keeper. [than grafted trees.
Rollingstone	..	11	6	.....	..	..	..	..	..	10	10	8	8	10	8	..	Good flavor and a good keeper. Trees on their own roots bore much better
Wolff	..	10	10	.....	..	..	..	..	..	10	9	10	8	10	10	..	Large fruit and a good keeper.
Speer	..	12	16	.....	..	..	..	..	..	7	6	10	8	10	9	..	Small fruit and poor flavor, but excellent for canning.
Wild, from Iowa	..	12	9	.....	..	..	..	..	..	..	..	10	10	4	9	..	Fruit large and yellow, good quality and a freestone.
Minnesota seedling	..	11	10	.....	..	..	..	..	..	5	4	10	10	10	..	..	A fair wild plum.
Orel 19	..	15	.....	.....	..	..	..	..	..	..	..	..	6	..	..	..	Curculio took them all.
Russ No. 2	..	.....	.....	.....	..	..	..	..	..	..	..	7	7	..	..	..	
Russ No. 3	..	15	12	.....	..	..	..	..	..	..	..	7	7	..	..	..	
			Aug.														
Arab	..	12	23	.....	..	..	..	..	..	..	..	7	7	2	..	..	Of fine quality, large
Blue Arab	..	.....	.....	.....	..	..	..	..	..	..	..	6	6	..	..	..	
Cheney	..	.....	.....	.....	..	..	..	..	..	..	..	8	..	..	..	..	
Davitt	..	.....	.....	.....	..	..	..	..	..	5	..	8	10	6	5	..	
Wood	..	.....	.....	.....	..	..	..	..	..	8	7	6	10	5	10	..	
Actic Russian apricot	..	.....	.....	.....	..	..	..	..	..	..	..	8	6	..	..	..	Does not seem as hardy as the Russian plums.
Cherries.			June														
Minn. seedling Russian	..	12	22	.....	..	..	..	..	..	..	..	8	8	8	..	..	
Minn. seedling Russian	..	.....	.....	.....	..	..	..	..	..	..	..	10	7	3	..	..	
Var from Wisconsin	..	24	24	.....	..	..	..	..	..	..	..	9	7	2	..	..	
23 Orel	..	12	22	.....	..	..	..	..	..	..	..	6	7	2	..	..	I have but little hopes of making cherry growing profitable.
Cerissa De Ostheim	..	13	23	.....	..	..	..	..	..	..	..	8	8	1	..	..	
Titovka	..	12	22	.....	..	..	..	..	..	..	..	6	7	2	..	..	
Brusselter Braume	..	13	24	.....	..	..	..	..	..	..	..	6	7	2	..	..	

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VARIETIES.	Date of vegetating.	Date of blooming.	Date of first ripe fruit.	Date of first picking.	Average diameter.	Average weight (ounces).	Average weight of bunch (ounces).	Quality (scale 0 to 10).	Firmness (scale 0 to 10).	Value for market (scale 0 to 10).	Value for home use (scale 0 to 10).	Vigor (scale 0 to 10).	Hardiness (scale 0 to 10).	Productiveness (scale 0 to 10).	General appearance (scale 0 to 10).	Rate of yield per acre or square rod.	Remarks.
Gooseberries.		May.															
Houghton		10										10	10	4			Very hardy, but badly infested with currant worm, and not productive.
Transparent		10										10	7	8			A low grower and fine fruit, but the cane is not hardy, and fruit mildews.
Mammoth		8										8	8	8			Fruit large and early with thick skin, very productive, but not quite hardy.
American Seedling																	Worthless, (may not be true to name).
Dewberries.		June	July.														
Windom		6	12					8		6	7	6	8	8	8		The foliage and fruit of the dewberry needs shade, and it does not bear cultivation well. My finest dewberries were grown among tall weeds; I shall practice the weed method hereafter and give no further cultivation than simply to plow a part of the patch every other year.
Bartel's		6	13					7		5	4	6	7	8	10		
Lucretia		6	13					7		6	5	6	6	10	10		
Mammoth										0			0				
Skake or Poke Berry.																	Not hardy—the root kills. Birds prefer the fruit to grapes.
Black Haw.																	Very hardy, good for an ornamental hedge or screen.
High Bush Cranberry.																	Hardy and ornamental, but does not bear transplanting well.
Blackberries.																	
Snyder																	Succeeds best of any.
Waschusett																	Fruit inclined to be imperfect; Of little value.
Sias Thornless																	Imperfect fruit of no value.
Agawam																	Early, hardy and productive, easier to protect for winter than Snyder.
Kittatiny																	Produces a few very large berries.
Wild, from Mankato																	Cane hardy but fruit very late.
Early Cluster																	Roots killed first winter.
Taylors Prolific																	Not well adapted, grows but little, and produces no fruit.
Wild, from N. Y																	Fruit very imperfect, thorny.
Stones Hardy																	Hardier than Snyder, but ripens so late that the birds get the fruit.
Ancient Briton																	Seems very hardy. Have not fruited it.

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REPORT FROM FERGUS FALLS EXPERIMENT STATION.

F. H. FIEDLER, SUPERINTENDENT.

Mr. President and Members of the Minnesota State Horticultural Society:

I herewith make my annual report of the experiment station at Fergus Falls, of which I was made superintendent in 1891.

The station is located four miles north of the city of Fergus Falls, on timber land. The natural timber consisted of poplar, red oak, burr oak, and birch. The land is all the way from 8 to 75 feet above the lake level. The soil is from 90 per cent. sand on gravel subsoil, to 85 per cent. clay on clay subsoil. Slopes south, north and west.

The stock at the station was supplied partly by the central experiment station, St. Anthony Park, Minn., and partly it was contributed by myself.

All plants labelled with name and number. The first lot arrived from the central experiment station May 2, 1891. It contained the following varieties: 2 Lady grapes, 4 Brighton grapes, 2 Green Mountain grapes, 2 Telegraph grapes, 1 Woodruff Red grape, 1 Moyer grape, 1 Dracut Amber grape, 6 Buffaloberries, 7 Golden Queen raspberries, 2 Kansas raspberries, 3 Progress raspberries, 1 Cromwell raspberry, 4 Thompson's Prolific raspberries, 2 Palmer raspberries, 3 Wineberry raspberries, 2 Ida raspberries, 1 Crandal currant, 2 Stewart currants, 7 Crystal White blackberries, 7 Erie blackberries, 7 Lucretia dewberries.

Lot No. 2, received May 13, 1891, from central experimental station. Contents: 12 Daisy strawberries, 10 Oliver strawberries, 12 Haverland strawberries, 6 Cloud and 6 Early strawberries, 4 Gladstone raspberries.

Lot No. 3 was procured from M. Fiedler, Sr., Perham, Minn. It consisted of 10 Houghton gooseberries, 25 Bubach No. 5 strawberries, 10 Green Prolific strawberries, 50 Jessie strawberries, 10 Caroline raspberries, 10 Gregg raspberries, 15 Ancient Britson blackberries, 5 Cherry currants, 4 Fays Seedling currants, 6 White Grape currants, 5 Victoria currants, 2 La Versailles currants, 6 Lees Prolific currants.

Lot No. 4 was ordered of C. G. Patten, Charles City, Iowa. Contents: 50 Red Jacket, 100 Warfield and 150 Manchester strawberries.

All the above were planted and cared for, and were growing well all summer until the 18th of October, when my neighbors cattle broke into and destroyed a large portion of the stock. Everything will be replanted next spring.

As this is the first year that this station is established, I cannot make a large and interesting report this time. Next year I hope to fruit most of the remaining stock and be able to make a more valuable report. In closing, I will say that I will be glad to receive any plants, shrubs or trees anyone has to contribute.

This is the only experiment station in the northern part of the state, as far as I know, and although no other station in this far north has been a great success, I mean to make this one as much of a success as it is possible, and I hope I can soon report good news. I received from the central experiment station December 23, 1891, a package containing cuttings of ten varieties of grapes.

EXCELSIOR EXPERIMENT STATION.

H. M. LYMAN, SUPT.

EXCELSIOR, MINN., Dec. 30, '91.

Samuel B. Green, Esq., St. Anthony Park, Minn.:

DEAR SIR: As to a report, I cannot make a very full one at this time. As regards the stock received from you last spring, it made a fair growth. Some of the varieties showed some blight; No. 164 very badly. Regarding my seedlings, I have several hundred which appear to be perfectly hardy; most of them are seedlings from hybrid stock. It seems to me that we cannot have an apple that will stand right through a long series of years and not show signs of decay in this part of Minnesota, unless it has some of the hardy Siberian stock in it, and then they come to bearing so much sooner than the common apple. I have about forty kinds in bearing, mostly small, generally from about the size of Transcendent up to size of Wealthy; only one as large as the latter, and it has been in bearing only two years; is a long keeper, an excellent variety and seemingly very hardy, though of course it will take several years to determine its hardiness. Most of my seedlings have been in bearing 10 to 18 years; they have nearly all produced a crop of apples every year. One of them has borne more than 50 bushels in the last six years. Most of my Russian varieties, that were put out 15 years ago, are dead. Two still remain. One called Pineapple has fruited for the last 10 years. It is a large white apple; season, last of August.

Respectfully,

H. M LYMAN.

LIST OF TREES, VINES AND PLANTS, ADOPTED AT THE LAST ANNUAL MEETING.

APPLES.

Hardiest Varieties of Apples (Pyrus malus) for General Cultivation in the Southern one-half of the State.—Oldenburg, Hibernal.

In Southern one-fourth of the State.—Wealthy, McMahon White, Tetofsky.

For Trial (Russian apples).—Charlamoff, Christmas, Borovinka No. 245.

Native Seedlings.—Peerless, Okobena, Patten's Greening.

CRABS AND HYBRIDS.

For General Cultivation.—Transcendent, Virginia, Orange, Florence Martha, Gideon's No. 6, Whitney, Pride of Minneapolis, Early Strawberry.

For Trial.—Dartt, Greenwood, Tonka, Estaline, Gibb.

GRAPES.

For General Cultivation.—Concord, Delaware, Worden, Moore's Early, Brighton, Lady, Janesville, Massasoit, Lindley.

For Trial.—Moore's Diamond, Poughkeepsie Red, Woodruff Red, Early Victor, Jessica, Moyer.

STRAWBERRIES.

Warfield, Crescent, Wilson, Countess, Bubach No. 5, Haverland.

For Trial.—Parker Earle, Shuster's Gem, Michel's Early.

RASPBERRIES.

Black Cap.—Souhegan, Hilburn, Ohio, Gregg, Tyler, Nemaha.

Red.—Cuthbert, Marlboro, Turner, Brandywine, Shaffer's Colossal.

BLACKBERRIES.

Ancient Briton, Snyder.

CURRANTS.

Red Dutch, Victoria, Prince Albert, Long Bunch Holland, White Grape.

For Trial.—North Star.

GOOSEBERRIES.

Downing, Houghton.

For Trial.—Triumph.

NATIVE PLUMS.

Desota, Rollingstone, Weaver, Forest Garden.

For Trial.—Cheney, Ocheeda, Rockford, Wolf, Hawkeye.

VALUABLE TREES, SHRUBS AND VINES.

For Windbreaks.—Cottonwood (*Populus monilifera*), White willow (*Salix alba*), Box elder (*Negundo aceroides*), Arbor vitae (*Thuja occidentalis*), White spruce (*Picea alba*), Scotch pine (*Pinus sylvestris.*)

For General Planting.—Green ash (*Fraxinus viridis*), White maple (*Acer dasycarpum*), White elm (*Ulmus Americana*), Burr oak (*Quercus macrocarpa*), White oak (*Quercus alba*), Hackberry (*Celtis occidentalis*), Butternut (*Juglans cinerea*), Black walnut (*Juglans nigra*), Basswood (*Tilia Americana*), Hard maple (*Acer saccharinum*), Choke cherry (*Prunus Virginiana*), Black cherry (*Prunus serotina*).

For the Lawn.—Mountain ash, Silver-leaved poplar, Populus Bolleana, Cut-leaved birch (*Betula alba laciniata*), White birch (*Betula papyracea*).

Conifers.—White spruce (*Picea alba*), Red cedar (*Juniperus Virginiana*), White pine (*Pinus strobus*), Arbor vitae (*Thuja occidentalis*), Scotch pine (*Pinus sylvestris*), Dwarf mountain pine (*Pinus pumilo or P. mugho*), Red pine (*Pinus resinosa*), Bull pine (*Pinus ponderosa*).

For Lawn Planting and Hardy Border.—Witch hazel (*Hamamelis Virginiana*), Purple lilac (*Syringa vulgaris*), White lilac (*Syringa vulgaris var. alba*), Persian lilac (*Syringa Persica*), Upright honeysuckle (*Lonicera Tartarica*), White upright honeysuckle (*Lonicera Tartarica* var. *alba*), Mountain maple (*Acer spicatum*), Berberry (*Berberis vulgaris*), Purple-leaved berberry (*Berberis vulgaris var, purpurea*), Stag horn sumach (*Rhus typhina*), Smooth sumach (*Rhus glabra*), Dwarf sumach (*Rhus copallina*), Philadelphus (in its several varieties), Shrubby cinque-foil (*Potentilla fruticosa*), Bush cranberry (*Virburnum opulus*), Snowball (*Virburnum opulus-sterilis*), Sweet viburnum (*Viburnum Lentago*), Cornel (*Cornus stolonifera* and *C. sericea*), Spiræas: *S. Billardii*, *S. Fortunii*, *S. Van Houtii*, *S. prunifolia*, *S. Sorbifolia*, Ninebark (*Neillia opulifolia*), New Jersey Tea (*Ceanothus Americana*), Common elder (*Sambucus Canadensis*), Red berried elder (*Sambucus racemosa*), Cut-leaved elder (*Sambucus nigra laciniata*), Siberian pea tree (*Caragana arborescens*), River locust (*Amorpha fruticosa*), Amorpha macrophyllae, Shoestrings (*Amorpha canescens*), Crimson wild honeysuckle (*Lonicera glauca*), Yellow wild honeysuckle (*Lonicera Sullivantii*), Salix Rosmarinifolia, Buffalo berry (*Shepherdia argentea*), Leatherwood (*Dirca palustris*), Burning Bush (*Enonymus*), Silver Berry (*Elœagnus argentea*), Bearberry (*Arctostaphylos Uva-ursi*).

For Hedges and Screens.—Arbor vitæ (*Thuja occidentalis*), Prostrate Juniper (*Puriperus Sabina*), Common berberry (*Berberris vulgaris*), Buckthorn (*Rhamnus cartharticus*), Russian mulberry (*Morus Tartarica*), Prickly ash (*Zanthoxylum Americanum*).

Climbers.—Virginia creeper (*Ampelopsis quinquefolia*), Climbing bitter sweet (*Celastrus scandens*), Virgins bower (*Clematis verticillaris*), Virgins bower (*Clematis' Virginiana*), Moonseed (*Menispermum Canadense*).

Hardy Flowers.—Perennial phlox (*Phlox hybrida*), Bleeding heart (*Dicentra spectabilis*), Decentra Cucularia, Larkspur (*Delphinum*), Paeonies, (in variety), Columbine (*Aquilegia Canadensis*).

Roses, (to be protected).—Prairie Queen, Gem of the Prairie, Harrison's Yellow, Madame Plantier, Princess Adelaide.

NOMENCLATURE AND CATALOGUE.

REPORT OF COMMITTEE ON NOMENCLATURE AND CATALOGUE.

BY J. S. HARRIS.

Mr. President and Members of State Horticultural Society:

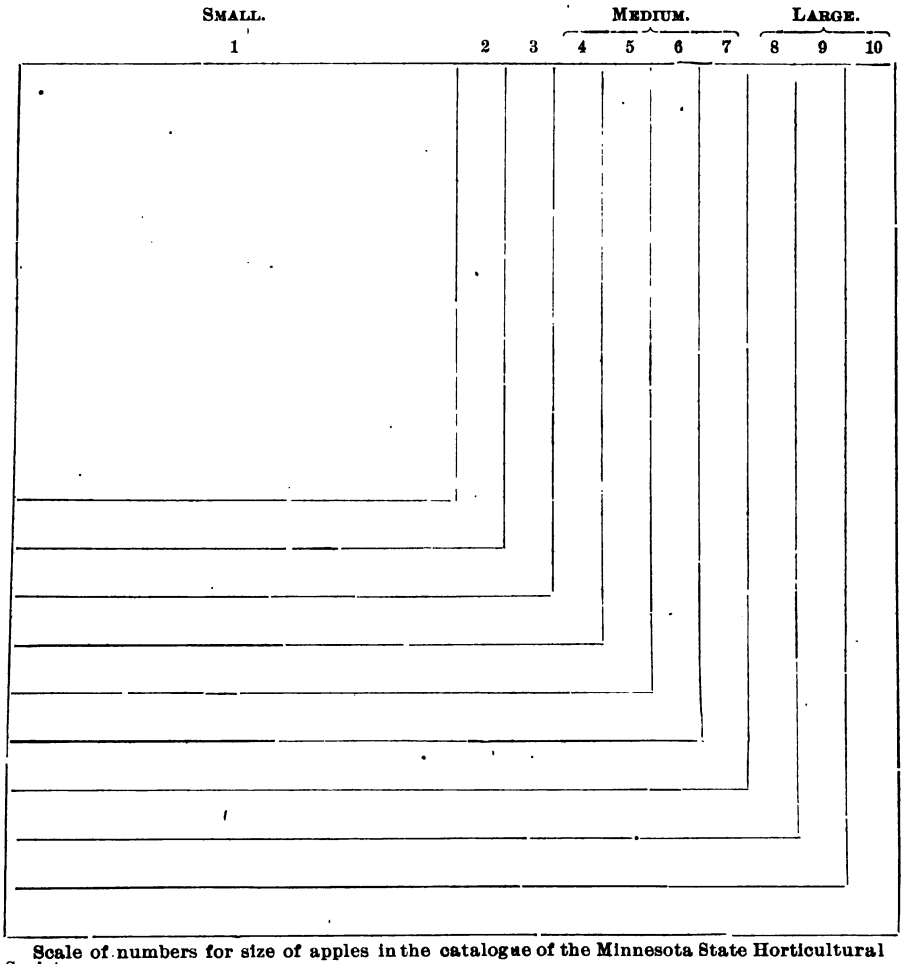
The committee on nomenclature has not held any formal meeting during the year. At the summer meeting of the society I looked over the exhibit of small fruits before they were passed upon by the awarding committee and found all correctly named with the exception of two varieties of raspberries in one collection, and the proper corrections were made. At the state fair I found a large exhibit of apples and a fair one of native plums, and also a great deal of confusion in the names. I made a pretty careful examination of the whole exhibit, and as far as able made corrections. I am very certain that several varieties of the Russians were not true to the names, in the lists of Prof. Budd, of varieties forwarded from Moscow, and described by Dr. Shroeder, of the agricultural college near Moscow, Russia. But taking into account that I am not yet familiar enough with the fruits of that country to be an expert, and that the descriptions made in that country might vary considerably from the appearance of the fruit as grown in Minnesota; I have not, except where very positive that they were incorrect, interfered with the names under which they were exhibited. As the varieties of fruit exhibited at the fairs and our meetings increases, it is becoming necessary that the committee on nomenclature give them more attention, and especially so as a great many of the trees are designated by numbers, and the planters have no means for finding out the corresponding names, and have since taken the name from some tree agent, who had even less knowledge of them. We found the most confusion in the large and elegant sweepstakes collection shown by Mr. R. C. Keel, of Rochester. The committee exonorate him from all blame in the matter. He purchased his orchard from E. B. Jordan. A considerable portion of the orchard had been topgrafted to Russians and seedlings, and frequently with more than one variety in a tree. Numbers of the varieties perished, and no one is competent to set them right without making a very thorough investigation. In justice to Mr. Keel, he should have such assistance in the matter from this society as it is in our power to give.

In the matter of native plums many new varieties having points of excellence are finding their way to our exhibitions, and the time has arrived when appropriate names should be given to such as have them not already, and they should be described and catalogued.

In the matter of catalogue your committee have no additions to make at this time. In the catalogues the size of fruit is generally designated

as small, medium, large and very large, terms that are indefinite. We recommend a system of designating the size by numbers from one to ten, starting at two inches in diameter and adding one-fourth of an inch for each number. Numbers one, two and three to represent all under medium; four, five, six and seven to represent medium; and eight, nine and ten, large; and if any varieties exceed the diameter represented by these numbers, designate them as very large. The plan will be very simple after it is once established, but it must represent the full average of the varieties as they grow in this state. The catalogue printed in the transactions for 1890 contains a number of varieties that will not ever again be raised in this state. It was published chiefly for future reference and need not be re-published oftener than once in ten years, but I believe it best for the cause of horticulture, that a catalogue of the apples and all other fruits now and hereafter grown here, should be published in each report and should be revised each year as is done in the Michigan, Illinois and some other state societies, and by the American Pomological Society.

In 1883, the American Pomological Society adopted rules for naming and exhibiting fruits. With this report I submit a copy of the section relating to the naming of fruits and recommend its adoption and publication in the forthcoming volume of transactions. (See index "Rules for Naming fruits"). I neglected to mention that under the rules governing the names by which fruits are known, the American Pomological Society has adopted the name of Oldenburg for our leading apple, the Duchess of Oldenburg, and as that society is the highest authority in America on these matters, I recommend that hereafter whenever the variety is referred to in our reports or in premium lists, and the catalogues of nurserymen, it be designated by the same name "Oldenburg."



Scale of numbers for size of apples in the catalogue of the Minnesota State Horticultural Society.

DRAINAGE.

DRAINAGE IN MINNESOTA.

PROF. W. M. HAYS, FARGO, N. D.

The contour of Minnesota is unlike that of any other state in the Union. The great sheet of glacial drift is peculiarly distributed. It is stratified with alternate pervious and impervious layers, and withal so piled up in morainic debris that lakes are very numerous, ponds are common, sloughs are in many hollows, large tracts are swampy; in many cases the land is nearly level, and sluggish streams are not uncommon. There is really a good per cent. of the surface of the state that is too wet for the plow, and this, too, in spite of the comparatively small rainfall of the state. Our farmers are rapidly subduing all the naturally drained lands for grain raising, and have begun to reclaim, for the same purpose, the moist and wet lands. As observed by all old residents in prairie sections, the culti vation of the soil, the pasturing and mowing of wild moist lands, and the general easier surface drainage resulting from open ditches, and a remova of native impediments to drainage in hollows and streams, and especially the removal of forest conditions in native forests, all tend to lower the soil water. This is shown by the necessity, after ten to twenty years, of making surface wells deeper, by the drying up of moist springs, by sloughs becoming passable, and even by the drying up of lakes and ponds. True, during wet cycles of years the water again partially rises to its old standard, but it never again reaches the original point. The average annual rainfall is not thought to have been reduced, but the amount kept in store on the surface and in the upper strata of earth is certainly materially lessened with man's occupancy.

We use a great quantity of the rainfall by making our arable lands porous and able to absorb the rain, which is again given back to the atmosphere through the leaves of growing crops. The upper several feet of our cultivated fields thus serves as a temporary storehouse for a great part of the water which formerly ran off the dense native sod to become a part of that filling up sloughs and lakes. Our people do not, as yet, take kindly to drainage. They have settled down into the practice of using their moist lands for meadows and with a few open ditches have converted their really wet lands into moist meadow lands. These lands, too moist for the plow, they have given the name of natural meadow lands Very many believe that it would be a great mistake to underdrain these lands. They say that these lands are their stand-bys for cheap, ough feeds in years so dry that arable lands cannot produce a crop. How much there is in this position I am not ready yet to say, for the western part of the state, but for the southeastern part I emphatically oppose the idea. These lands, if well drained, will not only produce hay of a better quality, but take the average of a series of years and they will produce more tons per acre of the better feed. Besides, underdraining allows these richest of our lands to be used for raising grains and other crops, giving

opportunity to change the thinner uplands more frequently to clover and grasses to rest them. These rich bottom lands are mines of stable manure with which to keep the hilly lands fertile. Where is the man who, after a series of years of trial believes that draining so-called natural meadow lands was a mistake? I believe in getting all lands into shape for short rotations, with two or three years to grass and as many to grain and other crops. Such a system is clearly more profitable than all grain on one part of the land and all grass on another part. Timothy and clover are our short rotation meadow and pasture plants and they make more and better hay and pasturage than do the wet land wild grasses assisted by redtop.

WHERE TO PLACE DRAINS.

With our comparatively small annual rainfall and our unusually deep pervious surface layer of soil, drains do not need to be very close together, and therefore to drain the wet sloughs and ponds in our undulating lands is not expensive. One line of tiles in the middle of a wet hollow, or if seepage water comes from the hills, tiles on one or both sides of the hollow often makes a slough into the richest part of a large unbroken field. Likewise a single short tile laid so as to catch seepage water, may entirely cure a springy hillside. Even where large flat areas are to be drained, unless the subsoil is very impervious, the rainfall is not so great that a tile is needed closer than every 100 to 200 feet apart for ordinary field crops. Tiles pay so well in many of these places that these rich lands often produce enough more in one to three years to pay for the tiles and the labor of laying them.

Where there is a large flow of flood or surface water open drains are needed, and these serve as outlets for the main tile drains. The general plan of open ditches should be to make the sides very slanting and then sew grass seeds, like redtop, white clover and Kentucky blue grass, so that the banks will be preserved by the sod from washing in times of flood. Where the fall is five or more inches to the hundred feet, the grades can be roughly laid out by means of a carpenter's level and a straight edge, or by some other easily improvised means, or even by the eye if the grade is considerable. These drains can be graded with water or with some rude arrangement so made that a carpenter's level indicates the grade.

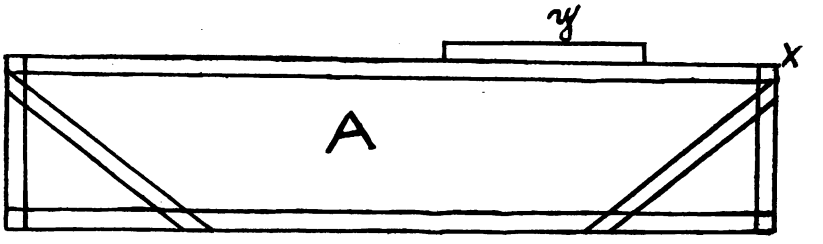
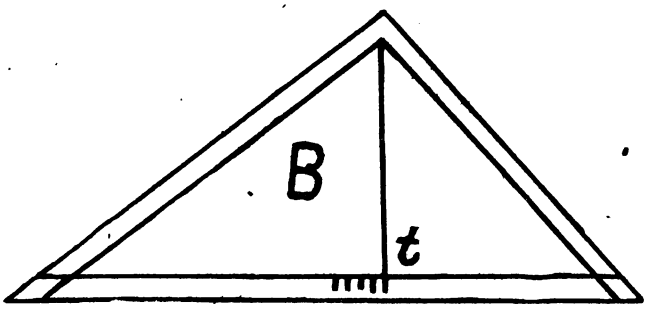


Figure A is to pull along in the graded bottom of the ditch. To make the grade six inches to the 100 feet drop the front end of the top board one inch at the point *x*, and then grade the ditch so that the bubble stands in the middle in the level at *y*. Figure B represents a triangle made of boards. When the lower board rests on a level surface, the plumb-bob rests on the central mark at *t*. The marks toward the back of the imple-



ment may be so placed that for every inch rise per hundred feet the plumb-bob will stand one mark further back. This implement can be easily made and marked on a level floor, and is handier than one shown at figure A. These implements are drawn up-grade, as the digging is usually begun at the outlet.

COST OF TILE DRAINS.

Owing to the few tiles needed by most fields where parts are wet, the cost per acre is slight. The cost of opening the ditch, of laying the tiles, and of filling is, with our prices for labor, ten cents per rod for each foot in depth. For an average of three and one-half feet deep we thus have 35 cents per rod for labor. The tiles are as yet abnormally high in Minnesota. There is not at present a single factory in operation, so far as we know. In Iowa and Illinois, where several factories in one county reduce the price nearly to cost, twelve to thirteen dollars per thousand feet of three-inch tiles has been reached. At this price, the drains cost 55 to 75 cents per rod according to the size of tiles used. Here the cost is five to ten cents more per rod, to pay for freights on tiles from southern Wisconsin, or adjacent parts of Iowa and Illinois. Before long the making of tiles will be a feature in many of our towns, and much land will then grow two blades of grass where now only one grows.

MAKING THE DITCH.

While good drains can be made with stones, boards and poles, there is nothing so permanent, and in the long run so cheap as tiles. When properly laid, with a uniform fall, there is little danger of their being injured by freezing.

Directions: Stake off the line of the drain carefully. If in land that can be plowed, throw out the upper six inches to one foot with the plow; then by line throw out the ditch with ditching spade or common spade down to within a foot or sixteen inches of the bottom. The top of the ditch should be only a foot wide, or a little less, to avoid handling so much dirt, and should slant in to the bottom, where it is merely wide enough for the tiles. The last spadeful at the bottom can best be taken out with the round-pointed, narrow tile spade. The tile drag or hoe, rounding on the bottom, is the proper tool with which to clean out and grade the bottom of the ditch. It leaves a concave bottom in which the tiles may be snugly laid by walking on them. Where peat, mud or sand makes a soft bottom the tiles cannot be trod in place, and in some cases it is even necessary to lay a board down to place the tiles on. The

tiles should be snugly fitted together at the ends, and several inches of the tougher clay part of the soil at once placed on them and tramped into place. The remainder of the dirt can be plowed in or shoved in by team with a scraper attached to the front wheels of a wagon, and so arranged that the team can easily back it up for a new load.

Machines for opening tile ditches are only fairly well perfected. For all ordinary work the laborer is the cheapest. In large tracts where no stones interfere, some of the tile machines make the labor cheaper. Elliot's little book on drainage, published by the *Drainage Journal*, at Indianapolis, Indiana, is a good and cheap book for those who expect to spend money in ditching.

FORESTRY.

THE MINNESOTA NATIONAL PARK.

J. O. BARRETT, SECRETARY OF THE MINNESOTA STATE FORESTRY ASSOCIATION.

The proposition to have a forest reserve in Minnesota is no new thing. For ten years or more it has been agitated. In one of his addresses, our worthy president, Wyman Elliot, earnestly called the attention of this society to its importance. Gen. J. H. Baker, and others, years ago introduced in our legislature resolutions to congress, urging a reserve, but failed for difficulties that could not then be overcome. During the session of congress in 1891, the timber culture act was repealed and the present forest reserve system substituted, and the president authorized to set apart from settlement such remnants of native woodlands in different parts of the country, as in his judgment are necessary to save the headwaters of our springs and streams from extinction, and thereby preserve the flow of our rivers and the valuable varieties of our timber in continuous growth. Minnesota's opportunity at last had come. The friends of forestry seized upon it. Under approval of the State Forestry Association the writer succeeded in getting a resolution through both branches of our late legislature, praying the president to locate, by proclamation, a park on the public lands in the northern part of the state. This initiatory success was followed by a petition to the president to organize the present proposed Minnesota National Park, which, exclusive of state swamp lands and some personal claims, contains about 6,000,000 acres, located north of the great iron belt, taking in nearly all the Indian reservations with the intent to cover the watersheds to our main rivers and lakes. Being but an opening wedge, and crude at that, it was expected that its boundary lines and provisions would have to be changed the better to secure the objects sought, before final action could be safely taken. This petition was signed by the governor, by ex-governors, judges of the supreme court, state officials, editors, educational professors and other influential citizens. At Washington it was pronounced a very strong demand for the reserve. No sooner had this foothold been gained than a determined opposition to the enterprise sprang up in Duluth, and in the chambers of commerce in the Twin Cities, and in a few other cities. The city and country presses largely have taken sides, mostly it is believed in favor. Men, of course, have the right of remonstrance, but when the remonstrance involves a plot to monopolize the domain in question, the reserved rights of the people, whose claims are paramount, necessitate a policy to benefit the opposers against their wills. But the opposition, though based in greed, is an eye-opener. The state is stirred up as it never was stirred before to discuss the merits of forestry.

During the heat of the agitation, I went to Washington to represent Minnesota at the meeting, on Dec. 29th and 30th, of the American Forestry Association. This enabled me to learn what methods should be employed to establish in the United States the forest reserve system. In a conventional body we appeared before President Harrison, stating our objects through Judge Higley, of New York. The president expressed his hearty sympathy with our movement, averring that the time had come when it was necessary to do something to save the remnants of our great forests from further destruction, and referred us to the Secretary of the Interior. We found the secretary a pronounced and determined supporter of the reserve system. We also appeared before the commissioner of the general land office and other officials, and found but one opinion prevailing, and that is, that something practical must be done immediately to protect the sources of our water systems, preserve our valuable varieties of trees, and the game and fish, on which all the people depend. We discovered, to a positive certainty, that the chief hindrance to success is, not at Washington, but at home among the people who have been mislead by designing syndicates. With renewed energy the friends of forestry have entered upon the herculean task before us. New York takes the lead. If we of Minnesota are vigilant at this momentous hour, we can have our great reserve without any cost to the state. New York let go her opportunity; the Adirondacks passed into syndicate hands to the serious loss of the feeders to the Hudson and other rivers, and to the injury of agriculture in the valleys; and now the friends of forestry there are obliged to besiege the legislature of New York to buy back 3,000,000 acres of those mountain lands at a great cost. Will Minnesota profit by the experience of New York, or indifferently part with her birthright to feather another plutocratic nest?

But to the methods. Among the forestry papers soon to go over the country is this address to the press, which as you will see, covers the work in hand.

THE FOREST RESERVE SYSTEM.

"The object of the proposed forest reserve system set forth in the memorial recently presented to President Harrison by the American Forestry Association, is as follows:

"It is not the object to withdraw these lands absolutely from occupation or use, but rather to increase their usefulness and the sum total of the productiveness of the territory, making each acre do its utmost for the benefit of our people.

"In the case of these reservations it is the purpose;

"To minimize the destruction of forest areas by fires and the wasteful and erroneous methods of forestry use now prevalent.

"To maintain and increase the lumber industry by a permanent and continuous yield of forest products on non-agricultural lands which, under the present methods are laid waste by fires, and made less productive.

"To promote railroading and wood-manufacturing industries by providing constant and increasing supplies of the raw material from cultivated forests; creating a home market for labor and supplies at these manufactories.

"To cultivate and develop new growths of valuable timber wherever the matured trees are cut for the market.

"To specially guard and protect the sources of our main rivers and lakes, and thus continue their flow for the benefit of the people at large.

"To prevent these lands from being taken for timber only and abandoning them after cutting the best, also to secure bona fide settlements on the agricultural sections.

"Nor is it the purpose to prevent prospecting for minerals, opening for mines, or other legitimate and rational development of these lands.

"To attain these objects, the American Forestry Association urges not only the reservation system, but at the same time the enactment of administrative laws which will secure these objects, and in a simple manner to satisfy all local wants.

B. E. FERNOW,
J. O. BARRETT,
N. H. EGGLESTON,
J. D. W. FRENCH,
E. A. BOWERS.
} Press Committee."

Most of the proposed reserves, and they are reaching into a dozen or more, are located among the Rocky Mountains in Montana, Colorado, New Mexico, California, and one on Turtle Mountain, N. D. These cover but little agricultural territory. Minnesota has no real mountains. Most of the region where it is proposed to locate our reserve, is comparatively level, but interspersed with hills, and along Rainy river are rocky ramparts, wild and romantic. Agricultural lands, in sections and belts, extend in various directions. The environment necessitates some special provisions for our reserve. Obviously there is no alternative left us but to set apart a special territory equal to the necessity, for the common welfare, as a permanent reserve, not to be used at all for farming purposes, but to be held to guard our headwaters from drying up, and to supply our people with fuel and lumber under a wise system of forest culture. Included in said reserve should be all lands of the public domain within the borders of the state, whether at the water sources or not, that are fire-scourged and desolate, and pronounced unfit for agriculture, and never can profitably be used for agriculture; but all the other lands of the public domain, that are naturally agricultural, or susceptible of being made agricultural, should be open to settlements, and all such public territory be placed under the custody of the United States army as a police force to protect it against trespass and fires.

Unless this or some other policy, more applicable to the situation, be employed and speedily, too, all is lost—yes, all! Let me here quote the warning words of J. S. Harris, one of the veterans of this society, who is posted in forestry, as given to me by way of encouragement in a recent letter. Alluding to the proposed reserve, he says: "If that region should be denuded of trees, it would prove the greatest calamity that could befall us. If the whole of Minnesota were settled up and all the rough and untillable places on the public and private domain, and one-tenth of every quarter section besides that is suitable for agricultural purposes, were covered with thrifty evergreens and deciduous trees, I believe it would so modify our climate that the apple, pear, peach and all the minor fruits would flourish here. On the other hand, if the avarice of man is allowed to destroy those forests that a beneficent providence has placed in our hands, I believe the effect will be most disastrous to our agriculture, and we might as well fold up our tents and move south. A few men with

capital could make fortunes, as is their intent, out of the timber now growing there. Some men make money even by highway robbery; but such men are of no use to the world. If that timber belt is destroyed, a generation of the near future will see the business centers of the north depopulated and the great streams of our commerce dried up. I maintain that this government should be held to its first principles—a government of the people, for the people, and not a plutocracy to protect and enrich a few at the expense of the many. I know the members of the Forestry Association will do their best to save the forest from ruin, and I am with you first, last and all the time."

Aside from the fruit benefits of the reserve mentioned by Mr. Harris, a summary of it all is this: Our headwaters will be economized to feed our lakes and rivers and wells, our annual floods largely forestalled, our people protected against the terrible winds of the frozen pole, our atmosphere made more humid to grow our food plants, damaging frosts largely neutralized, the rigors of our climate mitigated and rendered more healthful, and all our industries quickened into new and continuous activity for the people and the people's people of the twentieth century.

This society understands and well appreciates all these benefits. Then must the State Horticultural Society come to the rescue. When L. B. Hodges, the first secretary of the Forestry Association died, the cause languished; but this society, like a true sister, took forestry under her fostering care and saved it from breaking down under the "grippe" of public indifference. When the Forestry Association seemed to be on its "last legs," C. L. Smith, my immediate predecessor, rekindled a spark of the old time life, and then, too, when certain "soul sleepers" refused to furnish fuel. The present administration of the Forestry Association occupies the ground for which the veterans of forestry fought, and now that the battle engaging its patriotic courage is getting up to a white heat, the association appeals to her horticultural sisters to take the front again, both societies side by side in this grand fight; and the appeal will not be in vain.

DISCUSSION.

Mr. Barrett: Now in conclusion let me say one word further. At our forestry meeting yesterday, which was a splendid wide-awake one, there was present the chief spirit of the opposition, Mr. S. A. Thompson, of Duluth, the secretary of the chamber of commerce of that city. Notwithstanding the fact that he had done all in his power to defeat the motion, we treated him with marked courtesy, which neutralized all his combativeness. He made a very able speech that covered the ground admirably from his side of the house, and we went so far as to make Mr. Thompson a member of the executive committee. Next Monday we are to prepare an address to the people of this state, and I would like at this time to lay this statement before the society for consideration. I do not ask you to accept it now, because it needs some little attention given it by a committee.

(At this point Mr. Barrett explained, by means of a map which he exhibited to the society, the nature and extent of the territory which it is proposed to include in the proposed national park.)

Mr. Underwood: I would like to ask Mr. Barrett if he can state the points made by the opposition.

Mr. Barrett: There is no question but that the main point of the opposition is that of greed. Personally I do not incriminate anybody, but evidently the object is to so manage that territory as to accumulate wealth into the hands of a few, reckless of consequences. Mr. Thompson raised the objection that the laws were inadequate to meet the demands, and we have conceded that point. Prof. Fernow, at Washington, canvassed the situation in a public speech, and stated that congress would have to reconsider our land laws, on an occasion similar to this. And there is no doubt but that the matter will have to run that gauntlet, to its peril, and laws be enacted which will be adapted to the situation. Another objection that is raised is, that we interfere with the mining industry. Now you will see by the paper which I read that we encourage mining and all other industries. So we meet every objection thus far raised. I think that behind the claim of the opposition there is undoubtedly a secret, monopolistic scheme to obtain possession of our woodlands. Now I have a communication from persons in Montana interested in the reserve system, who state that there is opposition there, and it is solely because there is lumber there which these syndicates are determined to have. It is the same way in California.

Mr. Wilcox: Perhaps for the information of Mr. Underwood and the committee, I had better state one or two points in opposition that struck me more forcibly that it did Mr. Barrett. One point which they emphasized in particular was the fact that under the laws in reference to the park or reservation, like that under which the Yellowstone Park was created, the lands are absolutely set apart with no provision for allowing railroads through the reservation, except by special act of congress. Mr. Thompson states that certain railroads have tried to get across the corner of the Yellowstone Park, and the right has been refused to them; and he holds that in the development of Duluth and the northern regions of the state, that such a provision would be injurious, and says, that already there are lines of railroads planned which will necessarily cross this forest reserve, and that such an act as that which governs

the Yellowstone Park would practically shut off these railroads and the developments which would naturally grow from them. Another point which he emphasizes quite forcibly, is the fact that the present laws are entirely inadequate to secure what the Forestry Association is seeking to secure. I will say right here that in the preamble of his speech he stated, that with certain modifications, the chamber of commerce, of Duluth, would heartily join with us in securing what we desire. He also threw out the hint that we are working in the interest of the pine ring. We met that suggestion by placing Mr. Thompson on the committee of the Forestry Association and asking him to present at our meeting next Monday, a plan that might meet with the approval of the chamber of commerce of Duluth. For my part, I am willing to concede anything that will accommodate Duluth, that we can concede without destroying our forest reserve. Those were the main points of his opposition, and I am greatly in hopes that we may meet with some plan that will be more satisfactory, and that will do away with a large part of this opposition.

Mr. Barrett: Now, Mr. Chairman, we want to be exceedingly careful, for this society has great influence in Minnesota. This society has worked and sacrificed up to a point of positive influence. This society is stronger than the Forestry Association, and whatever we do let us do it with the utmost prudence so that we won't be obliged to take any back steps. I would not want anything to appear in any statement or resolution to the public that contained anything technical or ambiguous. Let everything be simple and plain, indicating that we look for the general interests of the state.

Mr. Harris: I did not make any preparations to take any part in the discussion of forestry, but it is certainly a very important question to us who are striving to follow horticulture for a living. The extract he made from my private letter to him expresses my views on the forestry situation. There are two elements, and both of them must exist and are essential to successful fruit culture, and to many branches of agriculture also. These are plenty of water and plenty of forests. Now if we could have a large basin of water located in that region that was known as the Great American Desert when some of we older men were boys, this vast extent of water would charge the winds with moisture as they came from the mountains, and when they reached us in Minnesota they would supply the dews and rains that we need, and we could get along with very

little timber for the fruit trees themselves. But we cannot get that condition, and the next thing to do is to get the trees, and let them draw moisture from deep down in the earth, and discharge it in the atmosphere. The more of these trees that we get, the more we will realize that this is a good country for fruit raising, for farming, and for a home. I have studied this question for years, and I have sometimes thought when those great blizzards come down from the north, that if that country was denuded of those great forests which our wise Creator has placed there; that if man became such a vandal and grew so selfish as to destroy that great wind-break, that this country would become in a very little while just what we supposed that region in Nebraska or Kansas to be when we were boys—that is, unfit for the home of civilized man, and fit only for the buffalo to roam over in summer, and from which even they would flee to seek winter quarters in the recesses of the mountains through the cold winter.

Now it seems to me, that the people of Minnesota, if they would only stop in this mad career after wealth, are intelligent enough, and can get up energy enough in the state to bring something to bear upon our law-makers, that will compel them to enact the laws that will preserve these forests, and also perpetuate forests all over the western country. For a good many years I was of the belief that the climate of southeastern Minnesota was growing worse and worse. And why? Simply because the farmers that went upon the land were cutting off the timber on their farms and burning it up. Now it is not over ten or fifteen years since I viewed acres and acres of log heaps burning just as they used to burn in Ohio. It was simply a robbery of the forests. But they have stopped that now, and the timber is getting more plentiful, and for the last five or six years, we, down at La Crosse and in that region, do not feel the cold weather as we used to. We think we get more rain and that things are improving, but if we, here in the State Horticultural Society, could get up enough zeal to induce every farmer in this country to put out trees on every little barren patch on his farm, and persuade the government of the state to set aside the barren places that nobody will ever take up, the improvement would come about a great deal faster and better. Down in Ohio, where I was born there has been in past years a reckless cutting off of the timber. But now Ohio has awakened to the danger, and there is a great deal of interest being mani-

fested there in the forest reserve. As soon as they cut out so much timber their crops grew less, and the trees, tnat were left, more or less of them died, and now they feel the need of forestry. I believe we are on the right track when we encourage it, and I don't believe that these men are interested in having that timber cut off or being harmed in any way; and especially so with reference to the mining industry. What would the lead mines of England be today if the government had not stepped in and forested those hillsides with the larch tree, and then taken control of it? They do not allow a larch tree cut down until they have a permit from certain societies. If it were not for the government aid and supervision they could not carry on those mines at all. It is impossible to carry on mining successfully in any country without a great deal of timber. It would be for the interest of a mining country to protect the timber, therefore, and not allow a single tree to be cut unless authorized by some society. Again, we of this generation have no right to rob our children. There is no man who possesses the right to eat up the bread that a future generation wants. He has no right to destroy the forests that favorably influence the climatic conditions of our time, and thus make it impossible for our successors to till the soil. He has no right to deprive the succeeding settler of the timber with which to build his homestead, and the time is coming when the young man who starts out to make a home will have a hard row to hoe, I tell you. The coming young man who starts out to put up the buildings to shelter his family and stock will have a fearful time if we allow the men who are so greedy for the almighty dollar to cut this timber.

Mr. Barrett: I suggest that Judge Moyer be asked to give his views on this question.

Judge L. R. Moyer: I will say briefly, Mr. Chairman, that I think that it is a mistake to allow that timber to pass into pri vate hands. It is my belief that the timber ought to be kept and owned either by the state or general government. I think there should be a police force enlisted to guard that timber against fires, and instead of allowing the land, as you might say, to run riot, it would be well to cut a certain portion of it periodically. The trees ought to be cut in such a way that the brush and tops and chips could be taken care of, so that they would not be an encouragement for fires. The state makes a great mistake in selling any of its timber land. I think that the state of Minnesota ought to hold on to its school

lands, and on to its swamp lands, so unwisely granted to different railroads. Of course, this question is one that the American people are slow to wake up to. We have inherited certain traditions that run clear back to old England, that makes every man feel that he ought not to be interfered with in regard to his own estate. I suppose that we got that idea from the fact that the common people of England were so greatly enraged at the time the Normans came into England and made such large reservations for game purposes, and we have felt that it is wrong for any body of men to interfere with our rights to cut down our timber. However, it seems to me that laws ought to be passed at this time for that purpose.

Mr. Underwood: It seems to me that one of the serious difficulties, which arises in protecting forests, is that of fire. I have experienced some such difficulty in the little forests that we have around our place on the high bluffs along the Mississippi river and on Lake Pepin. There is a good deal of land there that is not valuable for agricultural purposes, that is really of no benefit at all to anyone, except for growing trees, and they seem to sprout up there naturally. We would have a good forest of trees there, but the fires are set every year and rage along these bluffs, and sweep the trees down before them. Now, is there not some way to stop people from setting those fires? There should be some severe penalty, or a police force to control it. I think that is one thing that the Forestry Association ought to attend to.

Mr. Barrett:—I would suggest that Mr. Underwood's idea is excellent, but I am impressed that we must not cover too much ground at this time. Let us get one essential thing done. Let us take one step at a time. Then later on we will take another step. Some time ago I sent out a circular containing twenty-six questions, among the people of the state. One of the questions was "How much waste land have you got in your county that would be more profitable for tree raising than for agricultural purposes?" I have these statistics and they will be produced in due time. By them, I see there is a large territory indeed. Now, we can work the state by and by, when we have taken the initial step in reference to public domain. I will suggest, gentlemen, that we confine ourselves to the public domain at present, and by working with determination we will have a reservation. Then after we have made a success of this we can take up this other matter at another time. Now, just a word about our convention at Washington. We had there

Senator Dawes of Massachusetts, and he drew a picture of the condition of the forests of the famous Berkshire Hills, and said that the rivers were drying up and agriculture was suffering in consequence; but he said that lately an influence to preserve those forests had been started, and interest evoked, and they are re-clothing those mountains, though only to a small degree; he said that already they are reaping benefits from that course.

Mr. Wilcox:—There is just one thing more that I think should go down upon our records. While the beneficial influence of large bodies of water, as mentioned by our friend Harris, is well recognized and its modifications of the climatic conditions on the eastern and southern shores of our great lakes enable those situations to become prominent as fruit producing regions, the opponents of this park system declare that there is no well established data to show that large forest areas serve to modify climatic conditions in a similar way. Well, there are many of us who believe the statement to be true, which was made by an eminent professor, that the leaves of an oak tree, that is large enough to have two hundred thousand square feet of leaf surface, on a sunshiny day will evaporate fifty barrels of water. This is a field in which there has not been enough scientific investigation carried on, but we all know that trees evaporate large quantities of water through their leaves, and that as far as the root surface extends we find the moisture of the soil almost entirely absorbed. Now, if it is a fact that the leaves of trees throw off a great quantity of moisture, that moisture certainly goes into the air; and it is my belief that a forest, through its leaves, gives far more moisture to the air than the same area covered with water would furnish.

THE FOREST RESERVE.

H. B. AYERS, WASHINGTON, D. C.

Before taking such a step as the reservation of a large area of land for the purpose of cultivating timber, it is well that there be opposition, in order that there may be a thorough consideration of what results are likely to follow; and if, in this paper, I can point out some of the more direct and easily comprehended possibilities, I shall be content to leave the more abstruse to be expounded by those, who, by their training in European forest schools, may venture into dissertations that are difficult for one accustomed to think the growth and the cutting of timber a simple matter.

To the woodsman this question is one of vital economy. All know the value of the forest. All know that a well timbered forty-acre tract is worth from $500 to $4,000, while the best forty of wild agricultural prairie or brush land in the state is hardly worth over $400.

We also know that, as things go now, our great natural stores of timber are being cut, and little else than brush and blackened snags are to be found in their place on the old stump land. These stump lands, away from towns, are valued from $5.00 per acre down to nothing.

If the obvious suggestions of the least common sense were carried out, fires would be prevented and our timber would grow up again of itself, furnishing a second crop in from 20 to 60 years.

This crop would not be of the best; crooked and defective trees would predominate, but it would have many times the value of such land as we now find along Snake river, Pine river, the upper Mississippi river near Grand Rapids, and, in fact, on all of the poorer land that has been lumbered and burned over.

It may be as well to come at once to the root of the evil, which is this: *By the present system of disposing of the public timber lands, a bounty is placed on the destruction of the forests.*

The system operates in this way: the Federal timber is open to claimants at a nominal figure and the timber, when secured, is quickly sold, often at a gain of $100 per acre; all the marketable timber is then cut and floated down the stream, and the land is abandoned to the fires, that usually kill all or nearly all of the remaining growth.

The loss is the people's, a loss of resource. I do not refer to the timber that has been cut, for that has been used; but *our loss is greater than the total loss of the standing timber would be.* It is the loss to the state of that enormous amount of timber that is prevented from growing on lands that are producing nothing else, and which on the present forest area of the state should be 4,752,000,000 ft. B. M. per annum; to this must be added the amount of *marketable timber* destroyed by fire, which is estimated by some as nearly equal, during the past 30 years, to the amount that has been cut since lumbering began, or nearly 20,000,000,000 ft. B. M.

The more one dwells on this subject, the more the losses appear, swelling the amount to enormous dimensions, seldom fully appreciated.

The effect of fires upon hardwood lands, those that will in time be needed for agriculture, is not in Minnesota, as seems to be presumed by many, a benefit by diminishing the growth and reducing the cost of clearing. The facts are that, the better wooded land in Minnesota is, the greater value it has—and it may be well, also, to remark, that usually the well grown forest of hardwood costs less to clear, after the wood is off, than brush land.

Some of the evils of the present system are:

(1) Loss of the timber and fuel destroyed by fire.

(2) Prevention of an annual growth of 4,752.000,000 feet B. M.

(3) The giving of a bounty to the timber land grabber and speculator.

(4) The reduction of the bounty to the agricultural pioneer, by destroying without utilization the valuable growths of timber on agricultural land before it is claimed by the settler.

Until 1889, the United States timbered lands of Minnesota were open to homestead, pre-emption, scrip, and cash entry.

Under these privileges no difficulties were presented to capitalists or speculators in securing title to any vacant land they might desire, at a nominal figure. In the prairie and hardwood regions, but little land was taken except with the view of making a home on it. The non-agricultural pine lands, however, have been sought under every privilege, and very often under the false pretense of settlement. The pine thus acquired is, as a rule, immediately converted into money. This money is virtually a bounty on the destruction of the forests and an incitement to fraud.

Here, also, we touch the vital reason of the present apathy concerning the forest fires. The simple fact is, that usually it is not necessary to fight fire; and in other cases it is impossible to control it. The lumberman, whom the uninitiated would expect to carefully guard against it, is the one who really cares least, for with his broad perception, he masters difficulties or avoids them. He discovers that pine killed by fire will make good lumber if cut the next winter, and so before deciding where to cut, he waits until the fires have stopped running and takes the injured parts first.

Thus we see that, under the present system, the lumberman, who only of those living in the woods has capital enough to fight the fire, cares nothing for the young or succeeding growth for his own use, and his patriotism, like our own, is likely to end in words.

The nation's stores are thus being wantonly burned up, merely because the state fails to comprehend the situation, and stands idly gaping at the big fires, hardly feeling a twinge of conscience to suggest that it should hustle and put them out. No doubt our state government serenely dreams that in making laws against fires her duty is ended. Should we not put a longer brad in the goad stick, and at our legislature again? Our prosperity is in danger and these fires must be put out, or our lumber industry will dwindle from the present $35,000,000 worth of raw products to the paltry work of threshing engines here and there picking up snags and saplings.

We will have no place for our big boys to work in winter.

Our market for grain and vegetables will be reduced.

There will be less demand for our cattle and horses and beef.

Our taxes will increase because a larger part of our area will be lying non-productive, and because we will not have the lumbering and manufacturing plants to share the burden with us.

Our merchants will no longer have those remarkably long bills to fill out by the car load and the sled load, and to foot up with such satisfaction

Our hotel keepers and ranchmen will sell out to squaw-men, while instead of troops of woodmen passing up and down our rivers and roads, hunters, berry pickers, and squaws will follow the desolate old route and ford at the old crossings, as the bridges rot away.

Farms that paid well when the lumbermen were at hand to buy oats, vegetables, cattle and hay, are now growing up to brush, the roofs of the stables have fallen in, the walls are foul with frogs and mice, and the porcupines may be heard gnawing in the deserted houses day and night.

Such was the condition of all the borders of the Adriondack woods in 1884, after being lightly culled of spruce, and pine, and hemlock, and ravaged by fire.

The clearings made by the fire were tempting spots to the poor farmer, and many were lured to attempt the impossible, and were forced to abandon their cheap farms, that would have been profitable if the lumber industry had been left active to furnish a market for the hay, oats, vegetables and cattle; but the tracts of such land being far apart, and far from market, the expense of maintaining roads great, and taxes high on account of a sparse population, these settlers were driven almost by necessity to timber stealing, hunting, and berry picking to eke out a living, and finally gave up hope and moved away.

In very many respects the Minnesota woods resemble the Adirondacks; and, in so far as it is possible, we should take advantage of experience there.

In the beginning, and above all, the people of Minnesota should place the matter in the hands of men who can be trusted to do not only what seems right to them, but who are well informed on the subject; men who know at least the principles of forestry as most successfully practiced in Europe, and who are especially endowed with American sense and are capable of taking thoughtfully and wisely the few simple steps that are necessary.

The enormous expense and complications attending the work in the Adirondacks should be avoided by timely action, and to this end the following suggestions are offered to Minnesota:

1. To prevent forest fires.
2. To begin before the land passes into private ownership.
3. To avoid the cry of the enthusiastic but ignorant city people for "a park for recreation."
4. To seek the greatest good of the greatest number of people of the whole state.
5. To avoid injuring any established industry.
6. To promote and increase every possible industry making use of forests products.
7. To encourage the settlement of all the land that would be more profitable as farm than as timber land.
8. To prevent misconceptions of aims and methods.
9. To prevent entry of land for timber only.
10. To provide at once an efficient management of the reserves.

Towards accomplishing these objects we have accumulated sufficient experience to enable us to say that, after the forest lands have been deeded to individuals, the loss of jurisdiction by the government is so great as to fetter effective action to such a degree, that any attempt to do anything will be useless until the lands be bought back by the government.

H. B. AYRES,
Agent of the Forestry Division, Department of Agriculture.
Washington, D. C.

FORESTING THE GREAT PLAINS.

BY B. E. FERNOW, CHIEF OF FORESTRY DIVISION, DEPARTMENT OF AGRICULTURE.

In responding to the invitation of your secretary to prepare a paper on "Foresting the Great Plains," I shall not attempt to discuss at length any technical questions connected with the subject.

Even if we had sufficient knowledge and experience for such a discussion, it could hardly be done satisfactorily within the scope of a brief paper, and what I may have to say in regard to that part of the subject may be read in my reports, and especially in Bulletin No. 5, of which I send copies for distribution.

I propose in this short paper to address myself to the economic aspect of the question, and especially to the position which you, as an association, should take toward it.

Without meaning to reflect upon your body, with whom I have but slight acquaintance, except through your worthy president and a few of its members, it has occurred to me, that we have too many associations to talk and too few to act.

It is now well understood that associated effort secures with less expenditure of energy what private endeavor can hardly accomplish. While the discussions and the mutual exchange of experience, which such meetings as yours bring with them, are certainly a stimulus and an aid to the advancement of those who participate and read the transactions, yet the sphere of an association like yours should go beyond this, and be extended to such action as will advance horticultural pursuits in those directions, in which concerted associated effort can be most successfully applied.

Forestry, to be sure, is not horticulture; since, however, as I understand it, your association embraces forestry among its subjects, I wish to point out that and how your associated effort can and ought to do more for forest planting in the prairies and plains than to merely talk about it.

Horticulture and forestry as represented in your association, I take it, are only discussed in their relation and as adjuncts to farming or agriculture in general. This, at least, would be the case with forestry, for I suppose that, as yet, nobody is engaged in the forestry business by itself.

The relation of forestry to horticulture is that both have to deal with trees, but the objects and the methods of these two branches of arbori-

culture differ widely. In the one it is the individual tree, planted for fruit or ornament, with which we have to deal; in the other it is a mass of trees, planted for cover or for timber.

The relation of forestry to agriculture is that both have to do with the soil for the production of a crop; in the one case, however, the crop is utilized from year to year, in the other only after an accumulation of many years' growth. The planting of the crop must, therefore, be done with a knowledge of the changing conditions through many years, the changing relations of the different parts of the crop, and the behavior of the trees toward each other during their growth.

There is another relation of forestry to both horticulture and agriculture which pertains most specially to the prairies and plains of our western country. It is its protecting influence against injurious winds and its capacity to produce climatic amelioration.

I need not, before you, discuss at length this first influence. Everybody living on the plains and prairies knows the effects of the windbreak or can test it readily. That the compacter mass of a grove or forest-belt is even more efficacious in breaking the force of the wind—and thereby its evaporative power—and for a longer distance, can also be readily understood. But it seems not so readily understood in what manner climatic amelioration beyond that of a windbreak may be expected from a forest-belt, and a few words are necessary to elucidate this.

I cannot insist urgently enough upon the proposition that climatic effects must be *mass* effects; that only masses, dense and large, of foliage, large areas covered with tree growth, can have appreciable effects upon the local climatic conditions of the area lying to the leeward of them. For such climatic effects are produced in the main by difference of temperature, and thereby of humidity, in large air columns within and without the forest growth.

It is well known that the temperature of the air is derived by radiation from the ground, that the sun first heats the soil, and the soil heats the air.

If we were to cover therefore, a large area of ground with a blanket some distance from the ground, or else with a dense leaf canopy, thus withdrawing it from the rays of the sun, the soil under this protection would not warm as readily as that outside; in consequence the air below the cover would remain cooler, and with the impeded evaporation it would retain more moisture. The effect of such a cooler and moister area would naturally extend some distance above and beyond the protective cover, and any winds or currents of air traveling through this cooler and moister stratum must necessarily be modified in their temperature and humidity conditions, and impart these modifications to the open area beyond.

That this difference in temperature and humidity under a forest-cover actually exists has been well established by experience not only, but by careful, systematic observations for many years at stations specially established for the purpose, a discussion of the records of which will presently be published by the Forestry Division.

It stands to reason, that if the soil area thus withdrawn from the influence of the sun be small as compared with the surrounding open country, the amount or volume of air with such a difference of tempera-

ture and humidity will be small, and an exchange of the conditions of the two air columns, the one outside and the other under the cover, will take place rapidly, and the effect will be inappreciable.

Hence it would be foolish to expect climatic changes from the small plantings, which the single farmer is apt to make on his homestead. It would be like expecting to heat a large room with a single gas flame.

Wind-breaking effects, to be sure, he will realize, in the nearest neighborhood to the grove, but no perceptible modification of his climatic conditions.

Yet many small gas flames, properly distributed, will be quite effective in the heating of a room, and similarly many smaller plantations, each being sufficiently large and dense so as not to permit a too rapid exchange of conditions with the outside, will effect climatic changes.

The ameliorating capacity is simply a question of volume or mass of two air strata of different conditions, to be placed in counterpoise like the balancing of scales. And as here we know that a longer lever will allow a smaller weight to exert more force, so one manner of placing our timber belts will be more effective than another.

Let it be well understood that there is nothing small about the forces that produce climatic conditions, that, hence, to exert any influence upon it, the means must be proportionate to the antagonizing forces.

Hence forest areas, to serve as climatic factors, must be large, and they must be dense. Success in forest planting is best attained in a dense stand, anyhow not less than 8,000 to 10,000 seedlings to the acre, most of them not to develop into trees of size, but to serve as cover to the soil to prevent evaporation, and to be of any inferior kind that keeps a dense foliage, for in climatic effects success is attained in proportion to the success of shading the ground.

If then it is proposed to ameliorate the climate of prairies and plains by forest planting, I want to impress you with the fact that such can be done only by planting in masses, properly disposed; that it is not the tree which influences the climate, but masses of dense foliage, withdrawing large areas of soil from the rays of the sun. Forest planting of this kind is expensive in the start, especially since returns cannot be expected soon.

Good results in the shortest time, then, can be expected only from a systematic, well-directed and associated effort, and here your association can find as fruitful a field for action as in any direction, in devising plans for co-operation in "Foresting the Great Plains."

The elements of such a plan would seem to be as follows: divide that part of your state which needs it, into re-foresting districts, according to configuration or other natural conditions, or else proceed by counties; ascertain in each district, by correspondence and otherwise, where the poorest lands, that can be most advantageously devoted to tree growth, are situated, especially on the higher portions; ascertain also the situation and extent of existing groves and their condition; then determine upon the desirable location of an interrupted series of timber belts running in their greatest breadth north and south, or nearly so; each 5 to 6 miles in length and 1 to 2 miles in width, and so disposed as to cover from 20 to 30 per cent. of the area.

To secure the planting and to have it done in proper manner, organize a co-operative forest credit bank, somewhat in the manner of the build-

ing associations, in which every landholder who chooses, may become a stockholder and obtain the necessary funds for forest planting, to be done under such conditions as may be agreed upon between him and the technical advisers of the bank, so as to secure the result sought.

In addition, establish nurseries from which seedlings may be secured at lowest rates, in large quantities, of such kinds as are best adapted for such wholesale use, and as far as possible have the planting done under expert advice. The money to be loaned at lowest per cent. of interest and to form a lien upon the plantation until ready for the axe.

Such a plan may sound chimerical to you, and perhaps the time has not yet come when it is practicable. Yet I can imagine that it would be quite feasible to inaugurate some such movement in some of the better settled portions of your state, especially if it were possible to engage the interest of the state government and the state credit in such a work of internal improvement.

In conclusion, I cannot let the opportunity pass of directing your attention to another part of your state where another phase of the forestry problem awaits solution.

While we are discussing here the re-foresting of the plains at great expense, in the northeastern parts of your state you allow the irrational devastation of natural forests, by which thousands and millions of acres are turned into barren brush and waste lands.

As long, therefore, as the association does not see its way clear to inaugurate a re-foresting plan, it would be well to support a plan by which to prevent deforesting where it can do no good, but infinite harm. I therefore make a plea for the Minnesota National Park for which your association should use its best efforts immediately.

CLIMATIC INFLUENCES OF THE ROCKY MOUNTAINS UPON THE AGRICULTURAL PRODUCTS OF MINNESOTA AND DAKOTA.

BY EDWARD L. BERTHOUD, C. E.

Your question for discussion as to "The Climatic Influence of the Rocky Mountains on the Agricultural Products of Minnesota and Dakota," is a very complex problem. It requires the collection of a numerous mass of facts obtained by observation; and generalization of the effects of all, which makes a very complex equation, so to speak. Some of these can, however, be stated as forming part of the equation to be solved.

First—The presence, for the major part of the year, of vast snow fields on the Rocky Mountains, and its numerous branches or offshoots.

Second—The effect on temperature and air currents by the melting of these snow fields, and the drainage to the east and northeast of vast bodies of water of low temperature through the treeless plains, extending from the mountains to the Missouri River, and the Red River Valley.

Third—The effect on vegetation of prevailing westerly winds deprived of their humidity.

Fourth—The influence of the excessive radiation of heat at night on vast surfaces under a cloudless sky, at altitudes varying from 6,500 to

1,200 feet; when the air is deprived of its humidity, and dew a phenomenon from its rarity—all this taking place with an average temperature in summer of 66° to 75° during the day, with a fall at night as low as 40°.

Fifth—Another climatic influence in Minnesota and Dakota is the open nature of the region northward to Hudson Bay and the Arctic Circle; with no high mountain range to shield from the cold winds, or prevent the drenching rains of an atmosphere saturated with the chilling evaporation of vast bodies of cold water, which are only overcome and combatted by the dry warm westerly winds originating in the Rocky Mountains, with the winter climates that prevail occasionally from southern Colorado to the Arctic Circle.

Sixth—The slightly modifying influence of latitude, coupled with decreasing altitude as we go eastward to the Missouri and Red River valleys, an influence that exerts itself plainly in arboriculture, and seems to offer a barrier to their extension westward, although the thermometer appears fully as favorable as in lower altitudes elsewhere, where the same grow without impediment.

The Rocky Mountain range from the 36° to 49° N. lat. has a westerly trend from the 105° W. long. in Colorado to the 115° W. long. at the British American boundary.

East and northeast of this range, the open, treeless expanse of the plains of the Missouri valley are intersected by a multitude of large rivers, and their affluents, whose main sources are in the Rocky Mountain snowfields, whose abundant supplies of icy water are finally precipitated into the Mexican gulf, surcharged with the abraded matter of our high mountains and table lands.

This immense amount of precipitation is not derived from the Pacific, for the California, Oregon and Washington coast ranges cut off the Pacific Ocean humidity, while the humidity gathered in the Great Basin, and western Colorado is retained by the Wahsatch Mountains first, then by the Rocky Mountain range, thus arresting the moisture-laden clouds on their western slope. Hence our mountain supplies are obtained from the evaporation of this enormous treeless region, together with the evaporation of the Atlantic and Hudson Bay.

The excessive dryness of the atmosphere over the region indicated is not very favorable to the culture of maize and sorghum, plants that require rain on their abundant leafage to come to their maximum perfection, which irrigation cannot supply. This condition rules likewise in Colorado, and is independent of the question of temperature, for in western Dakota, and even as far north as Helena, Montana, excellent corn is raised in Jefferson Park on the Missouri River without irrigation, when planted on the low bottom lands of that river; while the cactus, a more southern plant, has been found as far north as Winnipeg Lake.

So we can safely say that the agriculture of the region extending from Red River to our Rocky Mountains, will be largely limited to herbaceous plants and under-shrubs, and to fruits that, in addition to their capacity to resist the high, dry temperature of our open plains in summer, must be fitted to withstand the excessively cold nights of a continental climate, such as prevail in Minnesota, Dakota, Montana, Colorado, Wyoming, Idaho and Utah.

FORESTRY AND ARBOR DAY.

N. H. EGGLESTON.

Some one has said, "The true basis of national wealth is not gold, but wood." This declaration may be startling to some persons, but nothing is more true. There is nothing which so enters into the daily life of all classes and conditions of people as wood in some form. We are indebted to it for shelter from storms, and from cold and heat. We are dependent upon it, in its natural condition, or in the form of coal—which is only the stored-up wood of former ages—for the fires which warm our houses, cook our food, and impel the engines, which move the machinery of our almost innumerable factories, or transport us over the continents and oceans on our errands of business or pleasure. Our houses are filled with conveniences constructed of wood. Innumerable articles of ornamental character are made of the same material. Indeed, turn where we may in our daily life, we meet the evidences of our dependence upon this material, wood. From the child's rattle to the old man's staff, from the cradle to the coffin, it is our almost constant companion and need.

Gold has no such use or importance. Nations have lived and flourished without it, and they can do so again. This precious metal, as we are so accustomed to call it, is a convenience as a medium of exchange, but we have devised, in these latter days, other things which will serve this purpose as well. Gold is valuable also for ornamental purposes; but other things can take its place in this respect. It is not a necessity, as wood is. Without wood mankind could not live. Were the trees to be entirely exterminated, the human race would soon be exterminated. To be deprived of them in any considerable measure would lessen greatly the comfort of living and send us back, as a nation, from our present condition of civilization to a barbarous or semi-barbarous state. This condition would come, not simply as the result of the lack of so much wood product ready for consumption in houses, factories and engines, but also of the lack of living trees in masses, the extended forests on the hillsides and mountains, which cause the snows of winter to melt gradually and the falling rains to ooze out slowly from the spongy leaf-soil, instead of rushing down the slopes to create sudden and disastrous floods to be followed by empty river beds and distressing drouths. It is the forests which by their shade and coolness temper climates, mitigating the influences of heat and cold, and thus rendering the labors of the agriculturist more pleasant and profitable—thus promoting the welfare of all, since all are more or less dependent upon the rewards of husbandry.

Spain is a standing testimony to the immeasurable value of the wood product of the earth, and the calamity which attends its loss in any considerable measure. Four hundred years ago Spain was the foremost nation of Europe. Flourishing in arts and arms beyond any of its contemporaries, she gave laws and dictated terms of peace or war to the nations around her, as France did under the first Napoleon. Writing of this country, Mr. Emil Rothe says: "Under the reign of the Moorish Caliphs the Iberian peninsula resembled a vast garden, yielding grain and fruit of every known variety in the most perfect quality and in end-

less abundance, and was thickly populated by a highly cultivated people. But then the sierras and mountain slopes were covered with a luxuriant growth of timber, which was afterwards wantonly destroyed under the rule of the kings. * * Now nearly all the plateau lands of Spain, being fully one-third of its entire area, are desert-like and unfit for agriculture because of the scarcity of rain and the want of water. Another one-third of its territory is covered with worthless shrubs and thorn bushes, and affords a scanty pasture for the merino sheep, the number of which is decreasing from year to year. The average depth of the fine rivers that cross Spain in all directions has greatly diminished." The "Encyclopedia Britannica" says, also: "The evils of denudation are, perhaps, nowhere more signally exemplified than in Spain. Rentzsh goes so far as to ascribe the political decadence of Spain wholly to the destruction of the forests." She lost that prestige which she had on the sea in the days of her "Invincible Armada," when her forests had been so far destroyed that she could not rebuild her navy, and now she is only a third or fourth rate power among the nations.

Other nations of the old world might be mentioned which, also have declined in population and power as the result of the reckless destruction of their forests. Once the basin of the Mediterranean Sea was the center and seat of the world's population and wealth. The shores of that sea were bordered with great cities, and the surrounding country abounded in fertile fields, which sustained a dense population. There the arts flourished,and wealth was ample. Great empires there had their seat and displayed their power. Now those cities are either lost to sight, or have mostly sunk to insignificance.

Speaking of the part of Europe here alluded to, Mr. George R. Marsh, in his well known work, "The Earth as Modified by Human Action," says: "If we compare the present physical condition of the countries of which I am speaking, with the descriptions that ancient historians and geographers have given of their fertility and general capability of ministering to human uses, we shall find that more than one-half of their whole extent—not excluding the provinces most celebrated for the profusion and variety of their spontaneous and their cultivated products, and for the wealth and social advancement of their inhabitants—is either deserted by civilized man and surrendered to hopeless desolation, or at least greatly reduced in both productiveness and population." And again, this distinguished author, speaking on this same subject, says:

"When the forest is gone, the great reservoir of moisture stored up in its vegetable mold is evaporated, and returns only in deluges of rain to wash away the parched dust, into which that mould has been converted. The well wooded and humid hills are turned to ridges of dry rock, which encumbers the low grounds and chokes the water-courses with its debris, and--except in countries favored with an equable distribution of rain through the seasons, and a moderate and regular inclination of surface--the whole earth, unless rescued by human art from the physical degradation to which it tends, becomes an assemblage of bald mountains, of barren, turfless hills, and of swampy and malarious plains."

Gradually the European nations became sensible of the fact that their deteriorated condition was the result of their own carelessness and misconduct, and they began to take measures to arrest the downward pro-

gress and to restore, partially at least, the former favorable conditions. Careful investigations have been made in regard to the influence of forests upon climate, upon rainfall and water distribution. Laws have been enacted for the protection of forests. Forest schools or colleges have been established for the purpose of investigating and teaching the laws of tree life and reproduction, and the best management of forests in order to secure their highest productiveness and greatest benefit to the country; and the forests owned by the governments have been placed under such management. In France, since 1860, more than $30,000,000 have been expended in reforesting portions of the country from which the woods had been stripped, and it is estimated that more than $30,000,000 more will be expended for this purpose before the necessary work will be completed.

The reckless destruction of our forests, especially in the mountainous western regions of the country, threatens to produce consequences as disastrous as those which have afflicted France and called for such a large pecuniary expenditure. Wherever the forests are swept from the mountain sides occasional torrents are produced by heavy rains or the rapidly melting snows, which year by year increase in their destructive effects, tearing the ground up for great distances, and carrying down masses of rocks and stones to cover the arable lands on the lower levels, and destroy their value for agricultural purposes. At the same time irrigation works are destroyed or made impossible of construction, because of the unimpeded flow of the water from the mountain heights, no longer held back or checked in its speed and force by the spongy humus of the forests, and the interlacing roots of the trees. The rapid destruction of our forests has been invited hitherto by the profitableness of the lumber industry, and the liberality and folly of the government in giving its lands freely, or at a merely nominal price, to whoever would take them, at the same time making no account whatever of the timber, which might be growing upon them, and which often has been worth ten times, or even a hundred times the value of the lands themselves. The natural consequence has been that persons, greedy only of gain, have got possession of the government timber lands for the simple purpose of cutting off the timber, and then have abandoned the lands as worthless. No regard has been had to the future use of the land, or to the present or future benefit of the public. To make money out of the trees converted into lumber, has been the simple and sole object of the lumbermen, and the public and the officers of the government, not understanding or not foreseeing the ultimate evil results of this reckless use or misuse of the forests, have allowed the evil work to go on without protest or hindrance of any sort.

But at length the lessening streams in some places, and the alternate floods and drouths in others, and the changed climatic conditions, have caused some attention to be given to the warnings, which have come from the experience of other lands and from the few among us, who have been carefully studying the condition of things at home.

We are sweeping off the forests twice as fast as they increase by natural growth. Our great tracts of white pine are being cut at such a rate, that white pine lumber will hardly be seen in the market a few years hence. The cry is also going up that the oak, the poplar and other woods are becoming scarce. It is evident that something must be done to bring the

consumption of the forests within the limits of their annual increase by growth, or we cannot much longer draw from the forests the $1,000,000,000 of products which we now do, and which have more than ten times the value of all the gold and silver taken from our mines. It may not then continue to be true that the wealth of the country is not its gold, but its wood. At least, the proportion of the two will be greatly changed, and for the worse in all respects.

What is wanted is a system of management which will use the forests economically and so as to keep up a perpetual growth, and therefore a perpetual supply. This we may easily have, if we will. This system of management ought to be applied to the forests which are owned by the nation, as such. No more public timber land should be sold, but only the timber which is growing upon it; and this ought to be sold at its fair market price, and should be cut under such government regulations that the trees will not be taken indiscriminately, large and small, but only as they attain good size and are ripe for the best use; and they should be cut and removed in such a manner as not to injure the smaller trees around them. The limbs and all portions not valuable for lumber should also be removed for fire wood or some economical use, and not left in the forests as such portions now are left, to become dry, and thus the ready means of starting fires that may sweep with destructive effect over thousands of acres of timber.

To accomplish this result we need to arouse public sentiment everywhere in favor of the trees; to awaken in people everywhere a sense of their great value, not only in a material and pecuniary point of view, but for climatic, domestic and also even esthetic reasons. We need to teach all that the trees are our best friends, our most valuable material possession; so that all will be disposed to use them in the best manner for the general good; to preserve them where they now are, using them as they grow, but allowing others to succeed them, and planting trees on the open and arid plains, from which they have been removed by causes which perhaps we do not know.

Among the means adapted to accomplish this desirable result, Arbor Day deserves to be mentioned, that new institution, as it may be called, which had so commended itself to the good common sense of our people that it has spread, with a rapidity unparalleled, throughout almost our entire country; and now that it has become so generally observed by our schools, it has taken on the character of a national holiday. More than this is true, for Arbor Day has made its way across the Atlantic and become established in several of the European countries, as well as in northern and southern Africa; and now, as I write, comes the announcement, that an earnest plea is being made for its establishment in New Zealand.

Some may think that when it is estimated that "Twenty-five thousand acres of woodland are consumed by the railroads, the manufactories, and the houses of the United States every twenty-four hours," to say nothing of the ravages of forest fires,—when 80,000 feet of timber are swallowed up daily by the Anaconda mine in Montana, (well named Anaconda), and at the smelting works owned by the same company 180 cords of wood are used daily, or 65,700 cords a year, and that the company scorn to make a contract for less than 40,000 cords,; and when again it is estimated that

it would take the entire tonnage of the world to convey the amount of timber annually consumed in the United States from any foreign lumber port,—I say, with these figures before them, some may think it savors somewhat of the ludicrous to talk of Arbor Day as an instrument for checking the destruction of our forests or making amends for their loss by planting new ones.

But the use and value of Arbor Day do not consist in the number of trees which may be planted on a single day of the round year by these voluntary tree planters, whether adults or school children, but in the sentiment, the feeling which they serve to, create. We have been a nation of tree destroyers, at first, necessarily such in many parts of the country, because the trees were so abundant that they had to be removed to make room for agricultural pursuits; afterwards, our rapidly increasing population, calling for the products of manufacture, and spreading westward to the prairies and plains destitute of trees, made a large demand, upon the existing forests for lumber. The profitableness of the lumber industry has often produced a supply outrunning demand, while reckless and improvident methods of lumbering have made a fearful waste of the forest wealth. Thus trees have, in the past, been looked upon as things in the way, and so to be got rid of in the most speedy manner, or as good for so much money, and so to be gotten into the market as soon as possible. The ulterior and higher uses of trees were for the most part unknown and of course unthought of. Now that their climatic effects are known, their influence upon the distribution of the rain fall and the flow of water courses,and their various beneficial effects upon human industry, and human health and comfort—what is wanted is the diffusion of this knowledge and some public recognition of it, which shall teach by example,and create what may be called a tree sentiment or feeling,which shall take the place of the indifference and ignorance,which have so long prevailed among us, and lead us to be tree-preservers instead of tree-destroyers, as we have been.

In this view of the matter, Arbor Day has an important place, and its observance deserves to be encouraged everywhere among us. Especially is this the case since its observance has been so generally connected with the schools. There is a proverb current in Europe to the effect, that what you would have appear in the nation's life must first be made to appear in the nation's schools. Acting upon this, several of the European nations make the study of trees and tree culture a necessary part of the studies of the school room, and they provide grounds in connection with the schools, sufficiently large to allow of the planting of trees and their cultivation by the pupils, under the instruction of the teachers, whose ability to give instruction of this sort is made a necessary qualification for the charge of a school. We ought to have a similar instruction in our schools, as has recently been recommended by the American Forestry Association at its annual meeting in Washington. The elements of tree growth should be taught in the common schools. The pupils should here learn to distinguish readily the trees that grow within their sight. This even quite young children will do with a little help from a competent teacher, and it will surprise many persons of mature years to see with how much interest the children will pursue the study of trees. They will not only study them in the school room or on the school grounds or in

books, but by the wayside as they go to and from school and wherever trees are to be met with by them. And so while Arbor Day, as it now is, deserves to be cherished and its annual observance will do much to interest the young in trees, and tend to produce a generation soon who will be their protectors and guardians. The observance of the day would be of still greater value, if it came as the culminating exhibition and object lesson of the botanical studies of plants and trees pursued in proper measure and proper manner during the annual course of public instruction. Plant the knowledge of trees in the minds of the children at school, and they will soon become the planters and preservers of trees for the nation.

DISCUSSION ON ASH.

Mr. Harris: There may be sections in this state where the ash will not grow, but where the box elder would. Now the ash is one of my favorite trees, and although it is not so beautiful as the elm, yet, it is a very thrifty growing tree. Still, as I said before, there may be localities in which some other tree would do better.

Mr. Barrett: I would like to hear Mr. Church on the question of the ash succeeding when planted on the open prairies.

Mr. Church: I have had very little experience with the ash tree, but I have grown a great many box elders. I noticed five or six years ago that those, who had planted the ash trees, were plowing them up and throwing them away. I know of a number in Brown Co., S. D., in the vicinity of Aberdeen, where I have resided during the summer seasons for ten years past, who have done this very thing. I have planted and raised from twenty-five to thirty thousand of the box elders, so I think that I can substantiate what I say, that I have had as good success in growing box elders as any man in the state. I have known of a number of instances where the ash tree has been planted instead of the seed. I should think the trees were two or three years old. I have noticed during the past two years, when I ride around in the various parts of the county—I have farms twenty or thirty miles apart, and in going to those different farms of course I pass by a great many tree claims—that those trees that were transplanted have not died. I have not seen an ash tree transplanted from the nursery in the past two or three years that has not done well, and I have made up my mind that these trees are superior to those raised from the seed. I have seen a number of farmers' tree claims within the last two years, and I don't know as I have seen a dead ash tree among them. If they will grow in that part of Dakota, I think they will grow almost anywhere in the world, for we have had three

or four dry seasons with hardly enough rain in many localities to wet the ground. I am inclined to recommend the growing of ash trees, because I know that they have done well in that part of South Dakota, where tree growing has generally been considered a failure. I have made a success of the box elder myself, because I have been out there every summer and kept the weeds out and the trees pruned. I have kept them as nicely as you would keep them in a park—free from grass and weeds —yet last year I lost 1,500 or 2,000 trees.

Vice-President Wedge: Were they box elders?

Mr. Church: Yes, sir; and I am unable to state what caused the loss. I think, however, it is probably owing to drouth, and perhaps partially to the fact that we have had very inclement weather. In the month of April we have most always a few days of warm weather, which causes the buds of the trees to swell until they are almost ready to burst into life, and then a spell of cold weather comes on in which the water in the watering trough freezes several inches thick; and as a consequence of this cold weather a great many of the trees, that have budded out, ultimately die. Last year a great many of those trees, that died, threw out long shoots. I sawed off some of this dead wood, and those trees came out as fine as any I have. At some future time I will give you a more detailed account of that.

Mr. Cook: Is not the ash more subject to being destroyed by fire than any other kind of timber?

Judge Moyer: We that live in western Minnesota and Dakota know that the green ash is well adapted to the prairies. I do not know anything about the white ash, as the only ash that we have in western Minnesota and eastern Dakota is the green ash. In 1873 I was out in Dakota near Watertown examining land, and I noticed around the little lakes in that country, that the only tree that grew there was the green ash. I noticed also at the south end of the Wahpeton and Sisseton reservation that the corner post was a green ash tree. The tree is a success in that country.

DISCUSSION ON TREES.

Prof. Green: The red pine is one of the finest pines that we have in the state. It is one of the best trees to stand the drouth, especially in sandy locations. It is a difficult tree to obtain, however, in large quantities.

Mr. Smith: Does it bear transplanting?

Mr. Green: Yes, I think it does.

Dr. Frisselle: In planting trees we select some kinds for their value as timber, and we plant others for their value as things of beauty. Again, we plant trees for their fruit, and I wish to remind the society that in some countries—and I think it is practicable to do the same thing here—in ornamenting the streets by planting shade trees along them, those trees are planted which will be of some practical value. There is a law in Spain that the streets shall be planted with fruit trees, and that the fruit of these trees shall be free to everybody. Those that eat the fruit are required to plant the seed or stone as they go along the street, and the result is that all through many parts of Spain the streets are lined with fruit bearing and nut bearing trees. They not only make a beautiful shade, but furnish a good deal of nutritious food for the people. Are there not some such trees that we can plant in this state—such as the black walnut—its fruit is of value and so is its timber.

Vice-President Wedge: It is a difficult matter to find a nut bearing tree that will stand the rigors of this climate. The black walnut will not do it, but I do not know about the hickory.

Mr. Richardson: I have seen black walnut trees, where I live, standing for 25 years without injury.

Dr. Frisselle: The sugar maple can be planted in this country and is a valuable tree.

Mr. Ludlow: I have not lost a black walnut tree yet in my experience, and they have been out 16 years, and bear nuts every year. This is in southwestern Minnesota. I also put out five years ago a lot of nuts that, came up and made a very fine growth. There is nothing to protect them from the winds that blow across our lake.

Mr. Smith: I believe that the largest amouut or quantity of black walnuts grown in any county of the state is raised in the county north of this, and I have never known the trees to winter kill, though the young trees will sometimes kill back a little; but they recover readily, and old trees bear walnuts quite freely.

Mr. Cutts: The white butternut grows very readily in Wright county.

Mr. Harris: The shellbark hickory has been found in three or four counties, but it is not hardy. It ranks just about with the apple, what we used to call the "Iron clads." It would would not be safe to plant it after you get through the triangle of counties commencing at Wabasha county.

Prof. Green: The prickly ash is a hardy shrub and is common through the state. It makes a nice hedge.

EVERGREENS.

REPORT ON EVERGREENS.

WM. SOMERVILLE, VIOLA.

Mr. President, Ladies and Gentlemen:

Being requested to write a short paper on raising, planting and care of evergreens, I will try and set forth a few points necessary to success. This has to be an individual enterprise on the part of the farmer, if success is insured. I do not believe it possible for a farmer, that only wants a few hundred trees, to try to raise them from seed, as they grow slowly for two or three years, and require more care and labor than the ordinary farmer is willing to give them to make a success. Plant small trees—if shipped from a distance, from 12 to 18 inches—raised in a nursery and by responsible parties, once but better twice transplanted. By transplanting when young they have more fibrous roots, and when planted are more likely to grow. Keep the roots as much as possible from exposure to sun and wind. Dig holes 12 inches deep and 2 feet square. Set the tree in this ground, made loose by digging, two or three inches deeper than it stood in the nursery row. Tramp the ground firmly around the tree, then mulch with wet straw from the stalls. If cared for in this way they will soon make a wind-break, and if set eight feet from each other around buildings and orchard it will beautify the home, and in a degree protect both family and stock from the howling blasts of winter, also give them the cooling shades of summer—an investment you will never regret. I have had thirty years experience in setting trees in Minnesota and from experience and observation, find different soils and different locations require different varieties of trees, but the same care and attention is applicable all over the state. Here in the southeastern part of the state we can plant successfully any of the spruce or pine family, they all grow well; but in the northwestern part of the state the pine appears to be more at home. So it is in my opinion the safest to plant Scotch Pine and White Spruce in that part of the state. I draw my conclusions from experience and observation, as I have run a small evergreen nursery for the accommodation of my neighbors for the last fifteen years, and occasionally would ship a few to different parts of the state, and with care have noted results. In 1873, '74, '75, Mr. Hodges was employed by the St. Paul and Pacific R. R. Co. to set parks on their newly located town sites, especially at Morris, Benson and Wilmar—I also taking a part with him. We planted Scotch and Austrian Pines, also Norway and White Spruce; and last summer in visiting those towns with the institute, I found nearly all the Scotch Pines we planted grown to be fine trees. The White Spruce stood next best, while there were but few of the Norway Spruce living. We also set

over 500,000 white willow and cottonwood cuttings along the line of road, but they have grown well only on damp ground, or where they were cared for by mulching. In the villages the best success was achieved by planting white and jack oak acorns. They are now trees from twenty to thirty feet high, large enough for fence posts. If on the tree claims they had planted acorns in place of cottonwood and willow cuttings, there would be greater bodies of timber over the prairies than there are to-day. The interest Mr. Hodges took in trees, and carried the same out on this line of R. R., and indeed over the state, has built for him a better monument than could be made of marble.

REPORT ON EVERGREENS.

G. W. FULLER, LITCHFIELD.

Of the value of evergreens little need be said. Whether as windbreaks, hedges, ornamental clusters, single trees, or scattered among other trees in a forest, everywhere and in every way they do a work no other tree can. They are not only bright and joyous all through the summer season, but when winter comes and strips the leaves from all other trees, and scatters them on the ground, the evergreen laughs old Boreas in the face, still waves her green mantle in the breeze, and sings her song to all who will listen, and prophesies of the coming resurrection and reign of spring.

At this day every man and woman should know the value and beauty of evergreens, and should need no urging to set them out largely and at once.

The real practical questions to be considered are what kinds to set, when and how to set them. And first, what are the best varieties? In answering this and the other inquiries, I give only my own experiences in the centre of this state. I do not pretend to say what would be best elsewhere and for others.

The Black Spruce is not one to choose for any purpose. It is very pretty for a few years, but soon develops into what it really is, the Black Jack of the swamps, and yet millions of these have been sold under the name of White Spruce, or more recently, American Spruce, by men who know and ought to do better. It is cheating the purchaser out of more than the mere money he pays for the trees, for it disappoints and frustrates his purposes for the future. For instead of having a fine growth of beautiful evergreens after a few years, he has nothing, but a lot of unsightly scrubs.

Neither is the Austrian Pine suitable, it will not stand the climate; the Norway Pine is better, and a few should be set.

The White Pine is perfectly hardy, and of firm shape and color, but rather light in foliage to make the best windbreak.

The Scotch Pine is the most rapid grower of all of the evergreens and for large windbreaks the best, especially if alternate rows of Spruce are

set in. This in fact would be my ideal windbreak, Scotch and White Pines, Spruce and forest trees, set sufficiently far apart, so as not to interfere with each others growth, or with the design of cutting out the forest trees for wood or timber.

The Norway Spruce stands well as it has in the past, and must in the future, as one of the best for general purposes. It is objectionable for ornamental purposes on account of its sunburning while it is young, especially for a year or two after being transplanted. But it is tenacious of life and recovers itself wonderfully. My oldest Norways, twenty to thirty feet high, have shown no blight for years. But the evergreen I am growing now, more than any other, is the White Spruce. I mean the the genuine thing, not the Black Spruce or American Spruce under that name. This tree is as symmetrical in shape as the Balsam Fir, retains its color the year round, and is not affected by early spring frosts. Standing side by side with the Norways and Balsams, it stands perfectly; while the Norways will be red all over, and the Balsams killed down by frost. I speak of trees under three feet from one to three times transplanted. After reaching a large size both the Norways and Balsams stand better. But I have had the first growth on my largest Balsams killed by a late frost; they start their growth very early in the spring. Were it not for this the Balsams would be, and is now, a favorite ornamental tree.

The Arbor Vitæ is of course the plant for small hedges or single trees to be trimmed to suit any taste.

As to the time of setting evergreens, I begin as soon as the frost is out of the ground sufficiently to dig them. I transplant my smallest trees, and keep at it until my largest are moved just as they begin to grow, that is when the buds begin to swell—and in this I have excellent success. My next best success is in August when the trees have completed their growth I have tried fall planting and fall heeling-in for the winter, enough to satisfy me that I can have no success in that direction. As to manner of setting I will only say that the chief points, after thorough and solid setting, is the clean and thorough cultivation of small trees and the thorough and heavy mulching of the larger ones; so thorough and heavy that the ground under it about the tree will not dry out the whole season.

DECIDUOUS TREES AND SHRUBS.

THE PLANTING AND CARE OF ORNAMENTAL SHRUBS AND TREES.

W. M. BERRY, SUPT. OF PARKS, MINNEAPOLIS.

I have been asked to explain the method of tree planting which I have used, and which has proved so successful with the trees in the parks of Minneapolis, that their health and vigorous growth has excited general remark and admiration.

In reply I have only to say that I have no new discovery to reveal, and my success in planting has been solely due to the careful observance of such directions as are given in every treatise on tree culture, and are well known to every nurseryman who understands his business.

These are: First, the proper preparation of the ground, with abundant room for the roots to spread, and a supply of rich earth to feed them; second, a careful selection of the trees, the all important point being that they have good roots and abundance of them.

Amateurs, in selecting trees from a nursery, for the most part, are governed in their choice chiefly by the appearance of the stem and branches of a young tree, which are of little consequence in comparison with the roots. If the latter are abundant and healthy, they insure such health and vigorous growth, that any trifling lack of symmetry will disappear long before the tree arrives at maturity; but if they are poor and insufficient, no tree can make a healthy growth. Nurserymen know this fact perfectly well, but if they try to convince an ignorant purchaser of it, he thinks they want to impose some poor stock on him, and insists on a straight stem and a good head.

I am always careful to have the ends of all large roots cut off smoothly on the under side, and in planting to have all the roots spread out to their full extent and fine soil worked into the interstices; and also to have the head cut back correspondingly to the roots, so that the demand shall not be beyond their power to supply.

After planting have every tree carefully mulched to a depth of five or six inches, and for a space considerably beyond the spread of the roots. Finally, I regard this as merely preliminary work. The tree is a mere infant, and must be carefully nursed and tended for several years after planting, giving it abundance of water in times of drought, and directing its growth by pruning, thinning or heading in the branches to make sure of its forming a symmetrical, evenly balanced head.

All these directions may be found in any good treatise on tree culture, but amateurs will rarely take the trouble to study them out, and still more rarely to practice them; and moreover, in nine cases out of ten, they buy their trees and have them planted on contract—a system which is fatal to the hope of satisfactory results. Care and labor in selecting, planting and nursing are essential to vigorous and healthy growth, and there is no economy in trying to escape it, or flinching from its cost.

My success has been solely due to the observance of these rules, and no one who neglects them need hope to attain it.

TREES, SHRUBS AND FLOWERING PLANTS OF THE UPPER MINNESOTA VALLEY.

LYCURGUS R. MOYER, MONTEVIDEO.

Geologists tell us that at the close of the glacial period, a vast lake covered all that part of northwestern Minnesota and northeastern Dakota now known as the Red River Valley. The outlet of this lake was to the south through what is now known as Lake Traverse, and then southeasterly through Big Stone Lake and the Minnesota River valley to the Mississippi. The melting ice sheet supplied enormous quantities of water, and a mighty flood poured itself through the channel of the ancient river. When this great Red River Valley lake began to find an outlet to the northward, the stream dwindled away to something like its present proportions, but the valley of the old glacial river remained. The leveling hand of time has now been smoothing out and washing down the bluffs for thousands of years, but the valley of the old-time river continues to be the most marked topographical feature of western Minnesota. The surrounding country is an elevated plateau of rolling prairie through which the valley is pretty sharply cut. The valley itself will average a mile in width and is from 100 to 200 feet deep.

The flora of this region presents many interesting features. In the river bottoms proper there are, in some places, quite large bodies of timber resembling the river valley timber of eastern Minnesota. The uplands are usually all prairie, and the flora for the most part is similar to that of the other prairie regions of the state. The bluffs, however, have a flora of their own, characterized by many immigrants from the western plains. The study of these peculiar plants is an inviting field for the student of geographical botany.

The question might arise: How did these plants from the arid regions of the far west get down into Minnesota where we find them? The answer might be that the seeds were brought from the far west by the great river before referred to.

But let us return to the trees. The original forest of this part of the state has mostly fallen before the axe of the settler. In some places the forest has been cleared away for the purpose of adding a few acres of corn land to our already almost unbounded expanse of prairie. This seems to be due to the destructive instincts of our American settlers from the

(once) timbered regions of the east. The short-sighted folly of this proceeding is calculated to make a lover of trees sick at heart. Our European settlers do better.

The most important tree in the original forest here was the Bur Oak (*Quercus macrocarpa*). It is a grand tree. Sending its long tap-root far down into the bosom of mother earth, it is proof against drought and secure against storms. In the full glory of its mid-summer foliage, its broad shining leaves flashing in the sun, it is a noble sight. In England it is regarded as the grandest of the oaks, and is treated as a choice exotic. Here, like some of our other common blessings, we do not appreciate it. Last summer I saw a woman having the Bur Oaks grubbed out of her door yard, so as to have Box Elders planted in their place. On the bluffs this oak makes a noble fight against prairie fires, and often bears the scars of battle. On the bottoms it attains magnificent proportions. A noble specimen cut down at Montevideo at an early day showed by its annual layers that it was an acorn at about the time that Columbus discovered the new world, and that it was not a very large tree at the time that the pilgrim fathers landed at Plymouth. No other oak grows in western Minnesota. It is rarely planted; but it ought to be.

The White Elm (*Ulmus Americana*) is a more common tree on the bottoms than the Bur Oak. It is oftener planted, too, and makes a fine shade tree where the soil is not too dry. The spreading branches of a well developed specimen would shelter a company of men; and, while it has the strength to defy the storms and winds of a century, its long pendulous branches are swayed by the gentlest breeze.

Less common than the White Elm, but a fine tree in every respect, is the Red or Slippery Elm (*Ulmus fulva*). In the early settlement of the country, it was the trunks of the red elm, left peeled by the Indians, that furnished the best fuel. The large leaves of this tree when growing in rich ground give it an almost tropical appearance.

A rare tree in this part of the state is the Rock Elm, (*Ulmus racemosa*) with corky wings on its smaller branches. It seems to do well under cultivation.

Closely related to the elms is the Hackberry (*Celtis occidentalis*), a common tree on the river bottoms and on rich hillsides. Planted and cultivated on the lawn it is a tree of great beauty, and it seems surprising that it is so rarely planted.

Growing along the river banks, and sometimes reaching great size, is the White Maple (*Acer dasycarpum*), commonly called soft maple. So far as I know, this is the only native maple found growing in the upper Minnesota valley. I have looked for the Red Maple (*Acer rubrum*) but have not succeeded in finding it. The Sugar Maple grows on the headwaters of the Redwood river southwest of Marshall, and on Lake Whipple near Glenwood. I have never seen it in our part of the Minnesota valley. Some of the best artificial groves in Chippewa county are largely planted with White Maple. It succeeds admirably on the prairies.

Closely related to the maples is the Box Elder (*Negundo aceroides*), perhaps the most thoroughly at home and omnipresent tree in this region. It springs up from seed everywhere and always grows, making a fine shade tree sooner than any other species. It sends it roots deep down into the earth and rarely succumbs to drought. It is our ideal for hardiness and

vigor, and when we get an apple tree that will grow like a BoxElder, apple growing on the prairie will begin to make some headway.

The American Linden or Basswood (*Tilia Americana*) is found in moderate supply throughout our timber lands, where the soil is not too low. Probably the temperate zone does not produce a finer tree anywhere for beauty of flower and foliage. The bees love it, and it is very rarely that our prairie planters give it any attention.

An important tree in these woods is the Green Ash (*Fraxinus viridis*), and it is probably the only ash found growing here. Next to the Bur Oak its wood is the most valuable. It is an excellent tree for prairie planting, perhaps one of the very best. It seems to me that a mistake is often made in recommending the White Ash for prairie planting. The White Ash is out of its natural habitat on the prairies, while the Green Ash ranges far westward. I have seen it growing around small lakes in central Dakota, where it was almost the only tree.

Along the river banks, where it can dip its feet into the water, the Cottonwood (*Populus monilifera*) is found and grows to be a magnificent tree. When planted on dry prairie it grows with great vigor for a few years, but is not a permanent success. The Quaking-Asp (*Populus tremuloides*), and perhaps another poplar, are rather rare here.

Willows of several kinds, the species of which I will not attempt to name are found on the river banks. One of these in cultivation makes a fine shrub, almost equal to the Laurel-leafed Willow of Europe. One or two species of upland willows are also occasionally met with.

The Ironwood (*Ostrya Virginica*) is occasionally found on rich hill sides. I am told that it is a good lawn tree. It holds its leaves through the winter.

On high rocky ridges is found the Red Cedar (*Juniperus Virginica*), the only conifer of this part of the state. It succeeds admirably in cultivation.

On timber margins and in thickets everywhere is found the wild Plum (*Prunus Americana*) in all its innumerable varieties, ranging all the way from the equal of the Desota to specimens bitter and astringent enough to make a pig squeal. The best varieties of Prunus Americana remain our most promising fruit.

A comparatively rare shrub is the Wild Red Cherry (*Prunus Pennsylvanica*). We find it only on ridges of granite rocks. It is beautiful in flower, but I have never seen its fruit. I suppose the birds take it all.

Much more abundant, and an elegant shrub when in bloom, is our Choke-cherry. I suppose botanists would call it *Prunus Virginiana*, but it does not agree very well with the discriptions given in most botanies. I am inclined to think that our Choke-cherry approximates to the descriptions that we have of *Prunus Demissa*, the Choke-cherry of the far west. It blossoms in long racemes, and fruits abundantly, and the fruit is of very good quality, too, much better than the fruit of the traditional Choke-cherry.

I have never seen the Black Cherry or the Sand Cherry here.

Perhaps the most striking shrub of this part of the state is the Sweet Viburnum or Sheep-berry (*Virburnum lentago*). Whether we view it in the spring, when literally covered with its broad cymes of white flowers, or in the height of summer, when its thick, broad, tropical looking leaves glisten like wax work in the sunshine, or, in the fall when it ripens its

load of pleasant flavored black fruit, and when its foliage takes on the gorgeous tints of autumn, it is alike interesting. It succeeds admirably in cultivation and I firmly believe it to be one of our best lawn shrubs.

Its near relative, the Downy Arrow-wood (*Virburnum pubescens*) is sometimes found but is very rare.

Two or more Juneberries (*Amelanchier Canadensis* and *Amelanchier alnifolia*) add interest to our shrubberies. Beautiful in foliage and in bloom, and producing a pleasant fruit, they are worthy of cultivation, at least from an ornamental point of view. One of our farmers here cut down and rooted out his lilac bushes because they did not produce a crop that he could convert into dollars and cents. The Juneberry might not suit him.

Wild Black Currants, Gooseberries and Black Raspberries are found in the woodlands, some of them of fair quality.

The Red-berried Elder (*Sambucus racemosa*) is not uncommon and possess great merit as an ornamental shrub. The common Elder (*S. vulgaris*) is quite rare. They both do well in cultivation.

A Bush Honeysuckle (*Lonicera glauca*) is found on rocky ranges, and does extremely well when transplanted to the lawn.

A fine shrubby Spiraea (*S. salicifolia*) is found on the margins of sloughs, and the Wild Rose (*Rosa arkansana*(?) is everywhere.

The Wolfberry (*Symphoricarpos occidentalis*) borders the edges of timber everywhere. It spreads all the time and enlarges the boundaries of the forest. Cattle are not fond of it, and where it obtains a foothold it usually persists. In depressions of the prairie, especially where pocket gophers have loosened the sod, the Wolfberry springs up. It is the forerunner of the forest. A vegetable humus gathers around it, and in its protecting shade the seeds of trees take root and grow. If forestry ever succeeds on the prairies so that trees grow in a natural manner, perpetuating and reproducing themselves, it will be by the aid of such shrubs as Symphoricarpos Occidentalis. It would give to our tree plantations a proper forest floor, without which they cannot permanently succeed.

The Burning Bush (*Euonymus atropurpureus*) is common. Were it scarce and difficult to raise, it would be considered an ornamental shrub of great value. Its blossoms are very inconspicuous, but its bright red berries in the fall are very beautiful. The same is true of its near relative, the climbing Bitter-sweet (*Celastrus scandens*), one of our best climbing vines.

Wild grapes of two or three species grow rampantly and luxuriantly throughout all our timberland, producing some seasons great quantities of fruit. The closely related Virginia Creeper (*Ampelopsis quinquefolia*), perhaps the best climbing shrub that we have, is common, too. Its noticeable purple fruit, and the remarkably brilliant hues of its autumn foliage are its strong points. Many people, however, are unacquainted with it, or look at it with suspicion, or openly call it "pizen." One of my neighbors sent to Rochester and paid a dollar for his Ampelopsis, pointing it out to his neighbors as something to be proud of. His pride was proper enough, for it is a plant worthy of being proud of, but the poor man did not know that it grew wild within forty rods of his door.

The Moonseed (*Menispermum Canadense*) and the Virgin's Bower (*Clematis Virginiana*), both beautiful vines, are too common to be appreciated. Amorpha Canescens is the common "Shoestrings" of the prairie. Amorpha

Macrophylla is less common and more beautiful, while Amorpha Fruticosa our common River-locust, is an ornamental shrub greatly valued by our eastern landscape artists.

I cannot do more than refer to our Cornel (*Cornus sericea*(?), the Kinnekinnick of the Indians. Its bright red twigs make it a marked feature of the winter landscape.

I have left myself scarcely any space to speak of the peculiar herbaceous flora of this region. Outside of the timbered bottoms, where the flowers are those familiar to the dwellers in the eastern part of the state, the most striking feature of the flora is the comparatively small number of different species represented.

With the earliest spring time, when the bellowing of the prairie-chicken begins to be heard, the American Pasque-flower (*Anemone patens, var. Nutalliana*) opens its pale blue petals on every hillside, to be succeeded later on by the feathery tails of its elongated styles. Other anemones follow—especially the Pennsylvania Anemone with its large white flowers, and Anemone Cylindrica, with its long fruit heads. The Carolina Anemone has a rather aristocratic and exclusive beauty of its own. It is a rather rare plant here. Buttercups of many species follow, and among them the Seaside Crowfoot (*Ranunculus cymbalaria*) on the borders of alkaline marshes.

Everyone who has been on the prairies knows the Ground Plum (*Astragalus caryocarpus*). The early voyageurs, it is said, cooked the unripe fruit pods instead of green peas. Of late years, however, these fruit pods have nearly all been infested by insects and no one would care to eat them.

Astragalus Adsurgens, a form from the far west, forms dense cespitose masses on dry hillsides. Its globular flower heads strikingly resemble red clover.

Astragalus Hypoglottis, another western form, grows on flat alkaline prairies, and is said to range northward to the Arctic Circle. It is a delicate plant with pale blue flowers in a globular head. Astragalus Flexuosus has been found occasionally, and another astragalus, probably new to the flora of Minnesota, that Prof. MacMillan has determined as Astragalus Newberri.

Closely related to these is Oxitropis Lamberti, with its silky pinnate leaves, and long spike of showy purple or violet flowers. It is one of the most beautiful of our immigrants from the far west.

Not uncommon on rich prairies is the Wild Liquorice (*Glycyrrhiza lepidota*), its root greatly resembling the Asiatic liquorice of commerce.

Another immigrant from the far west, often found on the Minnesota bluffs is Pentstemon Albidus. It is new to the flora of Minnesota, and a flower of more than botanical interest.

I must close here. The subject is too large. The peculiarities of the herbaceous flora of the upper Minnesota valley would require another paper.

Vice-President Wedge: I wish that Judge Moyer would explain the difference between green ash and white ash.

Judge Moyer: I am not enough acquainted with the white ash, as it grows in the west, to be able to explain the difference.

There is considerable difference, as I remember it, in the seeds. You know the ash seed has a long feathery wing to it. In the green ash it grows from the end, and on the white ash I think it grows more from the sides. There is a great difference in the young limbs, too. The young limbs of the green ash are much thicker than those of the white ash.

Mr. Underwood: They have a longer leaf and are greener in color.

Vice-President Wedge: Is the timber equally valuable?

Judge Moyer: It is about as valuable, though the tree does not grow as large.

Mr. Underwood: I have noticed that the ash seems to thrive well even on poor soil. I know of some that were planted several years ago on a sandy patch of ground that was dry as anything could be. So far as I have noticed there have not been any failures, though the trees were planted on the roadside and received no care at all. Yet they seem to be developing into handsome trees. I consider the ash one of the most valuable trees we cultivate, and I like them in the yard better than the elm. The elm is not as handsome a tree, and the winds break it to pieces more than the ash. If I had to sacrifice one or the other, I would give up the elm and save the ash.

Vice-President Wedge: That is precisely my own experience. We have hard maple, soft maple, box elder and ash in our yard, to say nothing of the nut trees, the black walnut and the butternut. We also have the white elm. I presume our ash is the green ash. They were taken from the woods, anyhow, and I value them considerably above any other tree that we have. These drouths that we have had of late years have been very hard on the box elder, especially. In the city of Albert Lea there are many dead box elders, hard maple, soft maple, butternut and some walnut—I think the butternut is the worst of the two nut trees—but the ash, though planted close to the street and in more unfavorable situations, have grown admirably. I have heard some objection offered to them on account of their foilage dropping early in the fall, but they color up a beautiful yellow before that takes place.

Mr. Barrett: I wish, Mr. Chairman, that we might all emphasize the value of the ash. In the region of country where I live, way out at the head of the Minnesota river, we have green ash growing naturally. We transfer them to the prairie, and find by experience that the green ash will thrive in the grassy sod, although it has a struggle. Still, it lives when other

trees die, and I think that we ought to emphasize its real merit. Our native green ash sends its roots straight down into the soil to find the moisture, and in consequence it is a hardy and beautiful tree. Our people have learned by experimentation the real value of the tree, and the demand is increasing for the ash.

Mr. Ludlow: I rise for information. I have some ash trees that have been growing eight years; that is, I transplanted them eight years ago, and to-day some of them are not more than two inches in diameter. They grew crooked, something like the Early Strawberry apple tree grows. The limbs in starting out grew straight out and then dropped down, and I thought it was better as an ornamental tree than anything else. Now, six years ago last spring, some seed dropped in the yard next to mine and an ash tree came up. I have trimmed it twice, and noticed that it is not the same shape as the others. The bark is of a lighter color than the ones I first spoke of, which were greenish looking.

Vice-President Wedge: Perhaps it is the black ash. That has a greenish looking limb and the smaller branches are smooth. It also grows slowly.

Judge Moyer: I have no doubt but that these trees are all green ash. Prof. Archer, in his report on the botany of Iowa, says that nearly all the ash trees in Iowa are green. The same is true of western Minnesota. I will say that I have observed that ash trees which grow from the seed are better and straighter than those that have been transplanted, and I think the same is true of the box elder.

Mr. Harris: I know that the black ash will not do very well on dry ground.

Vice-President Wedge: No. They grow very slowly indeed.

Mr. Harris: The white ash, where it grows in a sunny latitude, is considered to be a more valuable tree than any other ash. I believe the green ash is considered to be next to it. We know that on this soil it grows very rapidly, and soon becomes a large thrifty tree. There is no doubt but that it will soon become the most valuable tree, that we can plant as a farm tree. If we get too much of it we can use it for fire wood, and to repair our tools with, for the trunks of these trees make pretty tough timber. I have some trees on my place now that would make good fork handles or rake handles. That kind of timber you will always find valuable, but of course, to get such timber you must have it planted on rich soil.

Mr. Wilcox: In regard to the white ash of our New England hills, I would say that the shrinkage in weight just about corresponds with the shrinkage in dimensions. A foot of ash lumber, green, weighs about five and a half pounds, and a foot of it dry, weighs within a few ounces of the same. There is practically no shrinkage in weight in the white ash, but from what I have observed, I think there is considerable variance in the green ash.

OUR NATIVE SHRUBS.

MISS SARA M. MANNING, LAKE CITY.

Let us seek a few of the shrubs of our state in their homes, for to those who love the wild flowers, nothing is more fascinating than studying them in their native haunts.

In earliest spring the Service-berry blossoms along the streams; its clustered flowers are snowy white; its leaves are coated with a fine white wool, as though to protect it from the still lingering cold.

At about the same time, the Leatherwood is covered with a profusion of clear, yellow flowers, soon to be followed by the light green leaves. This shrub grows in a dense globular form. While rather rare in many parts of the state, it is common in the forest to the northward.

With it, in the cool northern woods, and occasionally throughout the state, is found the Leather-Leaf, a little shrub which opens a raceme of pure white flowers, from the tiny buds formed the previous autumn. It has thick, brownish evergreen leaves and slender, declining branches.

In the damp moss of the meadows, a trifle later, are beds of Labrador Tea. The underside of the yellowish green leaves has a brown, woolly covering, the branches are thickly strewn with small bunches of white flowers.

Another shrub of the bogs is the Wild Rosemary, low growing, with narrow, glaucus, green leaves, and showy clusters of pink and white flowers. In autumn the leaves become a rich, red purple, and, remaining all winter, make a pleasing contrast to the snow-covered ground.

Again, in the cool, dark shade the green moss is studded with the white flowers or scarlet berries of the Wintergreen, or, in dryer places, a creeping mat of Prince's Pine wreathes the ground, its flesh-colored flowers violet-anthered. These dainty little evergreens come near being herbaceous plants.

We must not forget the shy Arbutus, for where in all the wildwood is another flower so sweet? How it always awakens memories of the old home in New England, as we find it creeping about beneath the sheltering pines, with its red-brown, hairy leaves and rose-tinted blossoms.

A dense, prostrate shrub of the rocky hills is the Bearberry. The bell-shaped flowers are bright-rose or white, the berries, which appear in August and remain all winter, are deep crimson. The festoons of dark green summer foliage turn to shades of purple in winter.

Along the shores of the northern lakes is the Sweet Gale, its showy flowers, sweet-scented, blossoming in advance of the leaves.

On the sterile hillsides is the allied Sweet Fern, an aromatic shrub with fern-like foliage.

The Shrubby Cinque-foil is found along the rocky shore of Lake Superior. It has brown stems, leaves very silky on the underside, and yellow flowers borne in continuous succession from June until September.

A unique shrub of the Red River Valley is the Silver-Berry, the bark, leaves, flowers and fruit being covered with small silvery scales.

The Buffalo-Berry is similar, with silvery leaves and scarlet fruit.

Frequent near the streams and in the thickets farther southward are the Cornels or Dogwoods. The Red Osier Dogwood is attractive in summer, with corymbs of white flowers, but more noticeable in winter because of the brilliant red bark.

The Silky Cornel has purple branches, silky, dull green leaves, flat cymes of white flowers, and pale, blue fruit.

The Panicled Cornel has grey branches, numerous panicles of white flowers and also white fruit.

The dainty Dwarf Cornel, with creeping underground stem, is sometimes found about shaded rocks. It is conspicuous either because of the large flower-like involucre or the bright red fruit.

Many beautiful shrubs of the Honeysuckle Family are scattered all through the woods and copses of this more southern part of our state.

First of all may be mentioned that little favorite to be found now and then on the mossy carpet of the forest, the Twin Flower. It is a delicate trailing evergreen with a pair of nodding, fragrant flowers.

Several of the Arrow-woods, to which genus the Bush Cranberry belongs, are fine shrubs; especially so is the Withe-rod, with glossy, green leaves and white flowers.

The Maple-leaved Arrow-wood is striking in its autumn coloring of various shades of purple.

The Common Elder is a shrub which occupies considerable space. The dark green, massive foliage makes a beautiful background for the broad cymes of white flowers or the great bunches of purple berries.

Almost as showy in flower is the Red-berried Elder, while the scarlet berries mingled with the leaves make it much more so in fruit.

On the rocky bluffs of the Mississippi river are the Crimson and Yellow Honeysuckles, with their bright flowers and pale, green leaves thrown into relief by the darker greens about them.

Here, too, where all sorts of wild things grow in reckless luxuriance, are clumps of Mountain Maple, with broad leaves, deep crimson twigs and large clusters of seed vessels. Near it is the Bladder-nut with pinnate leaves, drooping bell-shaped flowers, or inflated pods.

In damp, cold ravines is the Mountain Holly, with purplish bark, smooth, oval leaves and pendulous, crimson fruit; also the Winterberry or Black Alder, its close-clinging scarlet berries half hidden by the leaves

in summer, but making the brightest touches of color in the winter landscape.

Where the bluffs near the river, we find the Burning Bush. The small flowers are dark purple. It is particularly ornamental in the autumn, not only for the abundance of crimson, drooping fruit, which remains for a long time, but also for the bright colored leaves.

More common on the river banks is the Nine-bark, with white flower clusters or purple seed-pods scattered along the branches.

The Button-bush is a moisture-loving shrub, since we always find it near streams. It has balls of white flowers hanging by a short stem, among the glossy leaves.

Then there is the Shrubby St. John's-wort, the yellow flowers borne in late summer.

The False Indigo is another shrub of the river banks, and though common, it is beautiful in foliage and in flower. It has pinnate leaves of dark green, and rich purple flowers, which are peculiar in having also purple anthers.

The Lead Plant is a dwarf shrub of the prairies. The violet purple flowers with their golden anthers are a pretty contrast to the whiteness of the closely crowded leaflets.

The beautiful Wild Roses of the different species are everywhere.

A shrub which seems to thrive well in all soils, even the dryest, is the New Jersey Tea.

One of the most rare shrubs of the state is the Witch Hazel, that mystic plant whose fringe of yellow petals appears in late autumn after the fall of the summer foliage. These feathery winter blooms ripen the following summer, when the seeds are discharged in a peculiar and forcible manner.

The Sumachs are all attractive shrubs. The Staghorn is often almost tree-like in its tropical appearance.

The Smooth Sumach is much smaller. It holds the great bunches of red seeds all winter on the brown branches. But they are more noticed because of the gay hues which add so much to the autumn scenery. In this respect, the Dwarf Sumach is perhaps the finest, making striking points of color, when the fern-like leaves of scarlet are richly massed against dark backgrounds.

Our native climbers make every woodland scene more beautiful. The Wild Grape and Woodbine clamber up the tree trunks, draping the branches in a luxuriant mass of graceful festoons; or the Bitter-sweet, by its clinging grasp winds itself about some shrub or tree, hanging its racemes of scarlet and orange pods from boughs, where all winter they remain, making little patches of color among the more somber shades.

Then there are the interwoven tangles of the Common Virgin's Bower, which trails over shrubs with its multitude of white flowers or plume-like fruit.

A much more rare Virgin's Bower climbs about the shady rocks of the bluff-sides. It has trifoliate leaves, and single, large purple flowers; the fruit is plumose.

Here too the Greenbriar, supporting itself by a pair of tendrils to each leaf, sometimes reaches the top of a tree. The leaves are smooth and shining, the umbles of flowers are greenish, the fruit is blue-black.

A dicœcious vine which grows abundantly about lakes and ponds is the Moonseed. It is a rapid grower, often covering a shrub or tree with its ivy-like leaves. It has loose panicles of white flowers; the fruit is black, covered with a bloom.

There are many other shrubs in the state equally worthy of notice, but surely enough have been mentioned to show that these natives have a distinct beauty of their own—from the spring time when leaves of tender green, olive or bronze, begin to clothe their branches, and buds burst into bloom, to the autumn with its various colors of foilage and fruit. Even in the winter, how the snow gives added value to the tints of gray or brown, while here and there bright-hued twigs or berries make a bit of brilliancy which pervades everything around.

It is a pleasure to know that there is, among landscape gardeners, an increasing interest in native plants, and that they are being more and more used in the laying out of public parks and large private grounds, producing fine landscape effects.

Let one only go out with his eyes open, and without being prejudiced against anything which did not come from abroad, he will doubtless be surprised at the diversity and beauty of the native plants which adorn the uplands and the lowlands, the forests and the prairies of our state.

LIST OF SHRUBS MENTIONED WITH THEIR BOTANICAL NAMES.

Virgin's Bower, *Clematis verticilaris;* Common Virgin's Bower, *Clematis Virginiana;* Moonseed, *Menispermum Canadense;* Shrubby St. John's-wort, *Hypericum prolificum;* Staghorn Sumach, *Rhus typhina;* Smooth Sumach, *Rhus glabra*; Dwarf Sumach, *Rhus copallina*; Wild Grape, *Vitis cordifolia, or Vitis riparia;* New Jersey Tea, *Ceanothus Americana;* Bitter-sweet, *Celastrus scandens;* Burning Bush, *Euonymus atropurpureus;* Bladder-Nut, *Staphylea trifolia;* Mountain Maple, *Acer spicatum;* False Indigo, *Amorpha fruticosa;* Lead Plant, *Amorpha canescens;* Nine-bark, *Physocarpus opulifolius;* Shrubby Cinque-foil, *Potentilla fruticosa;* Wild Rose, *Rosa humilis* and *Rosa blanda;* Service-berry, *Amelanchier Canadensis;* Witch Hazel, *Hamamelis Virginiana;* Dwarf Cornel, *Cornus Canadensis;* Silky Cornel, *Cornus sericea;* Panicled Cornel, *Cornus paniculata;* Red Osier Dogwood, *Cornus stolonifera;* Twin Flower, *Linnœa borealis;* Yellow Honeysuckle, *Lonicera Sullivantii;* Crimson Honeysuckle, *Lonicera glauca;* Common Elder, *Sambucus Canadensis;* Red-berried Elder, *Sambucus racemosa;* Withe-rod, *Viburnum cassinoides;* Maple-leaved Arrow-wood, *Viburnum acerfolium;* Bush Cranberry, *Virburnum opulus;* Button-bush, *Cephalanthus occidentalis;* Bearberry, *Arctostaphylos Uva-ursi;* Trailing Arbutus, *Epigœa repens;* Wintergreen, *Gaultheria procumbens;* Leather-Leaf, *Cassandra calyculata;* Wild Rosemary, *Andromeda polifolia;* Labrador Tea, *Ledum latifolium;* Prince's Pine, *Chimaphila umbellata;* Winterberry, *Ilex verticillata;* Mountain Holly, *Nemopanthes canadensis;* Leatherwood, *Dirca palustris;* Buffalo-Berry, *Sherpherdia argentea;* Silver-Berry, *Elœagnus argentea;* Sweet Gale, *Myrica Gale;* Sweet Fern, *Myrica asplenifolia;* Greenbriar, *Smilax rotundifolia.*

SOME NEW THINGS OF VALUE.

BY PROF. SAMUEL B. GREEN, ST. ANTHONY PARK.

FRUITS.

Arab Plum.—This is one of the Russians of the *S. domestica* type I found fruiting at M. Cook's place near Windom. The fruit is of large size; oval; skin tough; flesh sweet, melting and juicy. It reminds me of the Lombard, though of rather better quality.

Pennings No 1 Plum.—This is without exception by far the finest native plum I have ever tasted. In many respects it is superior to most plums of Eastern origin, and reminds me more of a hot house nectarine than of a plum. It is said to have come from a mixed lot of seed from Weaver and Miner. It has never been offered for general distribution. To me its great value is as an augury for the future. I do not believe we have yet nearly reached the limit of improvement of our native plums by selection, although I believe we will make our fastest progress through hybridization.

Sand Cherry.—The most promising of our neglected native fruits. It is already successfully cultivated in some of the most rigorous sections of our state, and is known as a reliable cropper, to be depended on when everything else fails. I am experimenting largely with it with very promising results. I reported on it at length in Bulletin No. 18.

Moore's Diamond.—Is a new white grape, that I think has come to stay. The bunch is large shouldered; skin tough; pulp melting and sprightly. The vine is a strong, healthy grower and very productive. The fruit ripens six days before the Concord.

Triumph Gooseberry.—A very prolific, large fruiting kind; vigorous and healthy; very promising.

SHRUBS.

Golden Elder (Sambucus nigra var. aurea.)—Valuable for its showy golden foliage. It kills back a little, but starts so quickly and vigorously in the spring that it soon outgrows any injury. Very desirable for livening up shrubberies. In blossoms, too, it is very pretty. Propagated very easily either from long hard wood or from soft wood cuttings.

Cut-Leaved Elder (Sambucus nigra var.)—Not so pretty, but more vigorous than the above. Valuable for its pretty habit and foliage, very hardy, easily propagated.

Mountain Fleece, (Polygonum cuspilatum.)—This has proven perfectly hardy. It is a vigorous grower and is loaded the last of August with a great abundance of panicles of white flowers; very desirable perennial herb, growing 4 ft. high. Propagated easily by suckers or from cuttings of the new wood taken off in July.

Rosa Rugosa.—This is sometimes called the Japan rose. Prof. Budd thinks the Japs got it from Siberia. It is very hardy—I think perfectly

hardy. Its beauty lies in its beautiful foliage, which is always perfect; in its very large single flowers, which are produced all summer and are pretty either in bud or full bloom; and in the conspicuous large bright scarlet fruit which succeeds the flowers. There is a semi-double variety offered in the market, but the single are far prettier. It may be propagated from seed or by cuttings from its underground stems. There are two varieties, the white and pink, and both of them should be in every collection.

Bocconia Cordata.—This is a hardy herbaceous plant; grows seven feet high and is very ornamental for the border. Has large green leaves, light-colored bark, and in August is surmounted with a panicle of pretty white flowers.

Pyrethrum Raceum.—These are beautiful, hardy herbcaeous plants in a variety of colored daisy-like flowers. It is not new, but it deserves more attention than it receives.

Caragana.—The caraganas are pretty low trees or shrubs with yellow, pea-like blossoms. They are very hardy. One kind I saw last summer was trimmed as a low hedge surrounding the flower beds in many of the gardens of the Mennonites. They were kept sheared off square on top, and reminded me of the hedges of box along the garden walks in many Eastern homes.

Lillium Triginum Floraplena.—This is a double form of the old tiger lily, and I think is an improvement on it.

Abies Pungens (Colorado blue spruce).—Perfectly hardy at the station; and I believe as hardy, and perhaps hardier, than any evergreen we have. Of pretty form. It varies much in color; many are a rich, bright green, while about one in every four will show some blue markings, and one in every ten will be of a most exquisite light blue color. This evergreen brings the highest price and is, I think, the most beautiful of any grown. It succeeds in the dry, cold climate of the foothills in Nebraska, and is found native in the higher altitudes of the Rockies.

Pseudotsuga Douglasii (Douglas spruce).—This is also a Rocky Mountain evergreen. It is a very rapid grower. Prof. B. E. Fernow says "he never on earth saw such a burden of lumber to the acre as that produced by this tree in the west." It too, as well as the *A. pungens*, is noted for its variation in color. It is highly recommended for grove planting. With us, perfectly hardy. Its chief value is, however, as a timber tree.

Abies Concolor.—This is another Rocky Mountain conifer. It is of spreading habit when young, but later takes an upward start and makes a pretty tree. Not so desirable as the A. pungens, but it is very pretty, and some specimens have a soft, yellow color that is wonderfully pleasant.

Populus Bolleana.—A most beautiful poplar of the *Alba* type. It grows in a close fastigiate form like the Lombardy poplar, but unlike the latter, it is a long-lived tree and very beautiful on the lawn. It can now be had of nurserymen at reasonable prices, and is, I think, destined to be very popular.

Populus Certinensis is a timber poplar that is coming to the front for tree claim and ornamental planting.

Salix Acutifolia.—This is a willow with a small, bright, hard, glassy leaf, which resists the attacks of insects more than any other kind. I found it doing well in Cottonwood county, where the white willow is seri-

ously injured by saw flies, and it makes a fine specimen on the grounds at the station.

Salix Aurea (Golden willow).—This is another of the Russian willows which is very pretty, and a rapid, healthy grower, making a large tree. Its chief beauty is in its golden bark, which is very beautiful during the winter and spring months.

Salix Lamsifolia (Laurel-leaved willow).—Very beautiful with its bright, glossy, dark green leaves. It is attractive on the lawn, and valuable for street or timber planting.

Douglas' Golden Arbor Vitae.—Not new, but not much planted. It is very hardy, and the most beautiful golden kind we have.

DISCUSSION.

Mr. C. L. Smith: I call to mind some investigations made this last summer, and I thought that while this paper was fresh in mind that it would be a good time to refer to them. Mr. Nagel also referred to the fact that many things were bought because they were high priced, and that brought my experience of last summer into my mind also. During the season I had occasion to drive several times each week from my home in Minneapolis to my home at Lake Minnetonka—beyond Lake Minnetonka—and in doing so I would sometimes go one road and sometimes another, and in fact would hardly drive over the same road twice in succession. I was familiar with the plants growing on the grounds and cultivated around the homes on the different roads, and I want to say that for our uses here in Minnesota, that our native plants are worth more than all the plants we can bring in from anywhere else. Now I call to mind in particular one place, where I have no doubt hundreds of dollars have been spent by the owner in the planting and cultivation of the grounds with high priced novelties, very largely from Eastern nurseries, and yet, with nothing but native shrubs, and plants and vines, and no cultivation except that given by a few cows and pigs, there was a finer landscape effect right over in the pasture beyond his door yard, than you got in his door yard. And more than that: during the latter days of September I drove with a party of Eastern friends about the parks of Minneapolis, around the lakes Calhoun and Harriet, and then out by one road, and back by another to Excelsior and Wayzata. Some of my friends were ladies and gentlemen who had traveled quite extensively in America and in Europe. Among them all there was no dissenting from this opinion, that for landscape effect the native plants, shrubs, and

trees and flowers,—those growing naturally—seen during that trip, were finer than any they had ever seen anywhere else in the world. And I want to say here, to the members of this society, that after twenty-six years' experience in the state of Minnesota, giving attention each year to these natives, and to those new things that come out each year, I believe one dollar's worth of labor spent in the propagation and cultivation of those kinds of trees, plants and shrubs that grow naturally here in Minnesota will produce better effects, and give better results and satisfaction than ten dollars invested in any of the foreign trees or plants. In our haste to get something that has a great name we overlook these little things that grow right at our doors, Again, there has been spent in the city of Minneapolis in the last eight or ten years, every year, thousands of dollars for the various kinds of climbing shrubs. Yet, let a stranger come in there, one who knows nothing about even the names of these vines or shrubs, and let him drive about over the city. There are hundreds and hundreds of porches, trees, arbors, and trellises covered by bitter-sweet and the common ampelsopsis, that grow naturally here in the Minnesota woods, and they will attract the attention of these people. But it is very rarely that you see one of those other vines growing in sufficient strength to attract any attention. If you have one, and want a vine for your porch, or door, or lawn, before you invest one single nickel in some plant coming from somewhere else, just look around the groves, and woods, and banks of the streams near to you, and see if you cannot find growing naturally, a tree, shrub or plant that will answer the purpose better than any you can buy.

Mr. Gould:—As a matter of fact, in the summer time, along the roadside around Minneapolis, there are to be seen some of the most beautiful shrubs and plants I have ever seen in the world. I pass there most every day, and I always sit next to the window of the coach and look out at them, and admire the beautiful picture. Now the hand of man has done almost nothing to bring this thing about. It is, as you might say, the natural condition. There has been little if any change in that respect since the time that this part of the country was first settled. But while these plants are well worthy of transplanting, it is a question as to whether or not they will bear it. I am unable to say myself whether they will bear transplanting into gardens, and make equal progress, as they do now.

Prof. Green: I want to make a little criticism on Mr. Smith's remarks. In the first place, Mr. Smith cannot name a single desirable shrub or flower, that cannot be obtained of the nurserymen. The nurserymen are very glad to buy anything, that they can get hold of, that is at all desirable. Then I want to say another thing. We have not a native rose that compares in foliage, flower or fruit with the cultivated ones, and the improved ones are about as hardy. We have not a native weeping tree that will compare with the weeping birch for pretty effect upon the lawn. That is a foreign tree. I admit that some of Mr. Smith's remarks are true about the tendency of people to buy high-priced plants, etc., in preference to some of the beautiful flowers that are cheaper. But it is better to buy of the nurserymen than to go into the woods. One reason why the simple plants seem to do better in the woods than upon our lawns is that the conditions for their well being is better in some respects in the woods than upon the lawn. That is one reason why they grow better. I am very much interested just now in the introduction of the Rocky Mountain evergreens. I believe that that is a field, in which there is a great opportunity for developing and bringing out plants, that will be of special interest to us here. The climate there is fully as severe as here, and I see no reason why the experiment will not be a success. Now, while I agree with Mr. Smith in the most of what he says, yet we want to get all the plants, and shrubs, and trees that we can. We want all the variety that we can have. I think when purchasing, it is a good plan to consult a good catalogue, and be guided in some degree by the suggestions that it contains.

Mr. Smith: I do not want Prof. Green to misunderstand me, I said that before they go and buy these high priced things that are said to be so very nice, they should look around and see how much better effect they can produce with our native plants and shrubs. I have growing in my yard now a native elm, an almost weeping tree, and I would not exchange it for all the weeping birches I ever saw.

HARDY SHRUBS.

J. M. UNDERWOOD, LAKE CITY.

It can be safely said that in the deliberations of our society, this subject has not been much discussed, and anything we shall now say will at least be new.

The time has come in the development of our state when interest is being taken in the embellishment of our surroundings. I was forcibly impressed with this fact one day last summer, by a drive of eighteen miles into the country on the Crystal Spring road in Wabasha county. Nearly every farm house had flowers growing in profusion around it, showing that their thoughts were not wholly absorbed by the wheat and barley, the cow and hog. But what most pleased me was the care bestowed upon the roadside. Instead of being allowed to grow up to thistles and other noxious weeds, to scatter their seeds broadcast over the fields, the ground was plowed and cultivated to some crop or seeded down, and closely mowed and raked clean. Even rented farms had an air of tidiness that was refreshing. How easy it is to cultivate the beautiful, and cover up the unsightly. Let the good seed grow, and speed the day when farmers' homes will be as attractive as the tradesman's. Commence this spring. Move the hog pen back, put the barnyard at the rear of the barn, and if you have an unsightly place which you cannot get rid of, hide it by hedgerows of lilac, honeysuckle or sumach. I shall not attempt in this article to speak of all the shrubs that may be grown. There are many new and rare sorts, that are of interest to a professional, but not necessary to the wants of the general planter.

VARIETIES.

1. ALMOND (*Amygdalus nana*) is the common Flowering Almond. There are two desirable varieties, the pink and white. They are a low growing shrub, and the branches are covered densely with beautiful double flowers in June.

2. BERBERRY (*Berberris Canadensis*) is a native variety and can be planted for a hedge or as a single shrub. It has yellow flowers in May and June, followed by beautiful red berries that remain on very late which are prized for making jelly. *B. Vulgaris* is of European origin. It has yellow flowers in May and June, followed by orange and scarlet fruit. *B. Purpurea* is covered with beautiful purple foliage and fruit. Very showy as a shrub or in a hedge.

3. BUCKTHORN (*Rhamnus catharticus*) is of European origin, foliage dark green, flowers white with small black fruit. Desirable for hedging.

4. DOGWOOD (*Cornus sanguinea.*) A native shrub. Is ornamental in winter, when the bark is very red.

5. ELDER (*Sambucus Canadensis*). Black-berried Elder; blossoms white and very sweet. The fruit is good for sauce and pies. *S. pubens* A valuable ornamental shrub with bright scarlet berries.

6. HYDRANGEA. (*H. paniculata grandiflora.*) It is the best of this class of shrubs; it is a native of Japan. Very beautiful, grows six to eight feet high. Perhaps this is the most desirable of all shrubs. It is covered in

September and October with large white panicles of flowers that change into beautiful colors as they mature. Even the skeleton bunch which hangs onto the bush late into the winter is pretty.

7. HONEYSUCKLE. (*Lonicera Tartarica*) or Tartarian Honeysuckle has pink flowers with beautiful red berries. It is a strong grower and very desirable. (*L. var alba.*) White Tartarian Honeysuckle. Similar in growth to the Tartarian; blossoms white with yellowish fruit.

8. LILAC (*Syringa josikaea.*) Fine in growth; dark, shining green leaves and purple flowers. (*S. Persica*) or Persian Lilac. A very desirable free bloomer. (*S. vulgaris,*) common Purple Lilac. (*S. var alba,*) common White Lilac. The lilacs are too well known to need describing. Plant them freely and enjoy their fragrance.

9. SUMACH (*Rhus cartinus.*) Purple Fringe or Smoke Tree. It has a curious blossom that looks a little way off like smoke. (*R. glabra var coccinata.*) Cut-leaved Sumach, odd in growth, with fern-like leaves; first discovered in Pennsylvania.

10. SNOWBALL (*Viburnum opulus var sterilis.*) An old and favorite shrub with large globular clusters of white flowers.

11. HIGH BUSH CRANBERRY (*Viburnum opulus*). Hardy and ornamental. Its fruit hangs on the bushes well, and is very showy.

11. SYRINGA (*Philadelphus.*) A well-known and beautiful shrub with creamy white blossoms resembling the orange blossom.

13. SPIREA or Meadow Sweet. These embrace a large number. Among the best of them are:

S. Billardi, rose colored, a constant bloomer.

S. Fortunii Alba, a dwarf white spirea, very pretty and in flower all summer.

S. Douglassi, rose-colored.

S. Reevsii, flora plena, fine double white.

S. Sorbifolia, ash-leaved; long spikes of white flowers, vigorous.

S. Prunifolia, a beautiful shrub from Japan, one of the best.

14. STRAWBERRY TREE (*Euonymous atropurpureus*) is a native shrub, exceedingly hardy, with beautiful and snowy fruit that remains on the bush into winter.

15. WEIGELIA. There is a large list of these beautiful shrubs, but I will only mention W. Rosea. It originated in China. It has fine rose colored flowers in great profusion in June.

There are a great many varieties that could be added to this list, that would be successful, if they were protected by laying down and covering in the winter; and this is so easily done that when you have gotten used to it, you won't mind it at all, but will be glad to do it for the additional beauty that will repay you the following season—but I am writing for the benefit of the farmer on the bleak prairie who wants things to thrive easily.

How to plant and care for them. As a rule I like grouping these shrubs. Put across and between the front and back yard, so as to hide the wood pile from the road, a row of Purple Lilacs. Then on the corner farthest from the house plant Honeysuckles, and in front of them some Syringas. The highest growing shrubs should form the back ground with the lower in front. In another corner of the yard plant Snowball and High Bush Cranberry, and in front put Hydrangeas. In fact, plant a Hydrangea or

two in every group, and wherever you can find a place for one. Their gorgeous blossoms are a joy, and you cannot have too many.

On the east side of a group of evergreens, the Purple Fringe does well. It is just the right protection. Where an ornamental hedge can be used the Purple-leaved Berberry is good. It should be in the sun however, as in the shade the leaves do not color well. On the drive to the barn, plant a row of Sumach. Their odd growth is interesting, and the foliage colors up beautifully in the fall, which, together with the fruit, make it very handsome. In a shady, moists oil, the Red-fruited Elder grows well, and when the red berries are on, it is a flame of fire. The High Bush Cranberry with its beautiful red fruit, and the Strawberry Tree with its odd berries are very desirable and should be freely planted. If you want a shrub that grows easily to hide an unsightly place, plant Spirea Sorbifolia. It has a beautiful foliage and the blossoms are pretty. Of course, the sweet Syringa with its fragrant orange blossom you will want near your bedroom window, and near by it put the Weigelia Rosea. Then keep watch for the humming birds, and see them fill themselves almost to intoxication on the sweets of the flowers until they are quite tame, and will almost forget to fly when they see you looking at them. The Tartarian Honeysuckles should be made a great deal of. They are vigorous, hardy and ornamental. They can be trimmed into an archway over one of the gates with pretty effect, and so it is with all the varieties I have mentioned. Each has its own peculiar charm. Do not plant them too close together. The larger growing kinds like the Honeysuckle, Lilac, Snowball, etc., need ten or twelve feet of room, except when used for hedges; the smaller kinds six or eight feet. Plant as you would anything else, in good soil, and give good cultivation. Prune after they are done blossoming. New growth will then start out and make wood for the next year's blossoms. Late flowering varieties can be pruned early in the spring. Cut out any superfluous and dead limbs, head them back a little to stimulate a new growth, spade around them every year, and mulch with green grass. If the soil is poor, manure them. You can well afford to follow up this line of ornamentation for it brings sure and permanent returns, and while the rose may rival them for sweetness, they have the stability of the oak.

QUESTION BOX.

The following question was then read by the secretary:

1. "Prof. Green says that the privet is not hardy and Mr. Dartt in his last report, says it is hardy. Who is right?"

Prof. Green: I do not think that I ever put myself on record as saying that the privet was not hardy. Still, if anybody should ask me if the privet was hardy, I would say that it was not. There is a Polish privet that has proved itself hardy. It is the Polish privet that I got from Professor Budd.

2. "Is the common privet more hardy than the California privet?"

Prof. Green: Yes, it is hardier than either the California or Chinese privet. Neither of them are of much account here.

GENERAL FRUITS.

BEYOND THE FORTY-NINTH PARALLEL.

T. FRANKLAND, STONEWALL, MANITOBA.

As many of the members of the Minnesota Horticultural Society are aware, experiments with a view to practically test the hardiness of the Russian importations and Northwest seedlings have for the last five seasons of growth been conducted here. Through the cordial co-operation of Profs. Porter, Green, Budd and Messrs Chas. Gibbs, Sias, Harris, Dartt, Barrett, Pearce, Luedloff, Peffer and others who supplied the trees and plants, these tests were made possible. A few remarks from me may therefore be of use at your annual meeting (which I am sorry I cannot attend) especially as part of your state is situated in the Red River valley. Mr. Probstfield, of Moorhead, seems to take a rather pessemistic view about Red River orchards, but as he in a private letter states that Stonewall may be a more favorable location, permit me to give a few of the results of experiments so far. The trees planted in the spring of 1887 were root grafts of one and two seasons' growth and, on high latitude principles, were allowed to branch as near to the graft union as possible —apple and other bushes are better than no trees. Trees that have been kindly donated with bare trunk three to five feet high have been scalded badly, and all have had to be decapitated to save their lives; and while a few of the others have shown sun scald at limb junctions their vitality does not seem to have been so much affected. Hay rope, gunny sack, evergreen, earth blanket, tar paper or other protection has not been practiced, neither have the pets been unduly stimulated to unnatural growth, from eight to eighteen inches each season being thought satisfactory—hence the tallest trees are not more than six feet. Shallow weeding and mounding up about a foot or eighteen inches is all the trouble I have taken in cultivating. Between the 12 feet rows the first two seasons vegetables were grown, and gooseberries, currants, etc. planted in the space (12 ft.) between trees. The third season strawberries were planted between the rows and allowed to pretty well cover the ground. While the crop of strawberries has not been so great as it would have been if thinned out, etc., the young orchard has had the advantage of being seeded down to strawberries instead of red clover, which does not do well here. There has been some little trouble to get out rank weeds, but if these are prevented from seeding they can be got rid of. Situated about 20 miles from Lakes Manitoba and Winnipeg the precipitation is somewhat greater than in some other parts of the northwest, hence in very rare instances neither at planting nor afterwards have I mulched the trees or used water to settle the roots, etc. There are about five hundred apples now in orchard rows and over a thousand plums (in thicket form) besides a few cherries. From seed of Russian apples and pears 40 two year olds have entered the lists for coming seedlings, and this year north central Swedish cherry as well

as a few Russian pits, Desota, Rollingstone, hybridized, Dakota and Manitoba plum pits have been carefully kept with the chance of producing seedlings that can at least grow side by side with Desota, Rollingstone, Cheney, Hawkeye, Owatonna, etc., and may bring the possibility of raising cultivated plums and cherries in Manitoba nearer success. Of the apple trees longest planted quite a number are showing fruit spurs, and I am promising myself the pleasure of bringing some specimens to your annual meeting in 1893. Over 80 plums and cher ries(Ostheim) blossomed the past season, but late frosts and hail left only a few samples.

The varieties giving most promise of success are:

Crabs—Tonka, Cherry Red, Martha, October, Florence, Red Lake, Whitney, Childs, Dartts, Greenwood, Gibb, Transcendent.

Apples—Lieby, Red Cheeked, Rubetz Naliv, Charlamoff, Koursk Anis, Red Repka, Pointed Pipka, Antonovka, Hibernal, Arabian, Victor, Ostrekoff.

Plums—Desota, Cheney, Rollingstone, Luedloff's seedlings, Owatonna.

Cherries—Ostheim, Cerise, Besarabian.

Northern Iowa and southern Minnesota experimenters, where winter's cold extorts the cry, "Frost is King," and summer's heat is said to be semi-tropical, seem to call for Steele County elevations and subsoils loose enough to permit the roots of trees to penetrate subterranean springs to supply the moisture excessive evaporation would otherwise deprive them of. In this, the basin of the extinct Lake Agassiz, which Professor Bryce informs us has for ages been receiving on its rock bottom the drifts from the higher elevations, until now its shores are contracted to the deeper depressions of lakes Winnipeg and Manitoba, thus changing water courses and even, as he asserts, deflecting the flow of the Red River from the Mississippi to Lake Winnipeg. In all this there seems to me the right forces at work, when we know how to apply them, to solve the problem of horticultural possibilities in the near future. It may be that what applies to northern Iowa and southern Minnesota as to elevation, air, drainage, etc., would have to be modified here about 800 feet above the sea level; but from the fact that many of the varieties of apple, plum, etc., reported and recommended as almost worthy of general planting, have done as well here as with you; and as the northern portion of your state, in similar surroundings to ours, should have the benefit of your deliberations, I have penned these rather rambling remarks in order that a general discussion may follow that will be beneficial not only to beyond but beneath the 49th parallel of latitude.

Mr. Barrett: I had a conversation with Mr. Frankland at the time he made us a visit two or three years ago, in reference to the environment of his locality, and he informed me that a vast forest extended north of it. It is doubtless due to the very fact that there is a vast forest there that protects him from the frozen winds of the north that he will probably be as successful there in that northern region, as they are in Russia on the same parallel. I throw out this thought by way of calling attention again to the necessity of our giving more attention to forestry.

SUCCESSFUL FRUIT GROWING IN WESTERN MINNESOTA.

W. J. WICKERSHEIM, IDLEWILD.

Small fruits, crabs and the Duchess apple are successfully grown in Lincoln County by a half dozen farmers. Several farmers grow small fruits for themselves, neighbors and the home market. All of these apple trees that were heavily loaded with blossoms in 1890, bore but few blossoms last spring. Yet the dozen or more trees in our orchard that bore blossoms, yielded eighteen bushels of crabs. Two Duchess trees (we have but five) bore a few blossoms and yielded one-half bushel of matured fruit. Judging from the blossoms, we did not expect many crabs, but as a great part of the fruit matured, the yield was a fair one. We sold eight bushels of crabs at $1.25 to $1.50 per bushel, and besides gave a few bushels to neighbors, and from the proceeds we have bought a full supply of apples for the winter. Consequently we have not only grown our own early crabs and apples, but a full supply of winter apples in our Michigan orchard (?). But in time we hope to grow here in Lincoln County on this dry, windy prairie, enough winter apples to supply ourselves and the home market. Last spring quite a number of Peerless apple trees were planted in this county, introduced here in the fall of 1890 by Mr. O. F. Brand of Faribault. I have seen the most of them the past summer, and from their appearance and growth, I feel that they must be adapted to our climate. I certainly have never seen so remarkable a leaf on an apple tree. Its leaf, together with its extreme northwestern origin and record of a quarter of a century, makes me think that we now have a winter apple for western Minnesota.

A farmer residing near Lake Hendricks, about 1900 feet above sea level, has a small orchard, principally Early Strawberry crabs. All of the last named trees were well loaded with fruit. As my work took me to every part of the county last spring and fall, I had a good opportunity of seeing fruit trees, and I did not find an Early Strawberry over seven years old, and with some protection from the hot winds, that was not loaded with fruit. The Prices Winter Sweet, Brier's Sweet, Whitneys No. 20, Meader's Winter and Orange crab bore fairly well in 1890, but last spring the blossoms were too few for a crop.

I find that those orchards that are located on level ground, or on land sloping toward the north and protected by windbreaks on the south and west, are doing well, where the trees are hardy and prolific, while those that are on high ground and unprotected from the hot south and southwest winds are in every case a failure.

Hon. John Hanson is quite proud of his young orchard. A few of the older trees yielded several barrels of crabs this year. To protect his trees from rabbits and sun scald, every November he places eight pointed laths within six inches of the base of each tree, thus forming a cylinder about the trunk, and then ties the laths together at the top with a cord. This forms a cone-shaped protection. He also protects the limbs of the young fruit trees in this way by gently bringing them within the cone.

On my "Idlewild Farm" there are a half dozen or more plum and choke-cherry thickets. In 1890 there were about ten times as many choke-cherries as the birds could eat, and our neighbors and their children could destroy. We also had enough good plums for our own use. Last year we picked about 25 bushels of plums for the home market and our own use, and as many more bushels were picked by the neighbors. We planted about 100 plum trees in 1879. We cultivated them one or two seasons and mulched them twice, and no further attention has been given them, yet they have borne heavily about every other year for the past eight years. Our plum trees are loaded with blossoms every spring, but as the conditions for pollenization are not always favorable, the yield is sometimes very small. On account of the very dry weather the past years, the plums were of an inferior quality. We have about a dozen varieties of wild plums belonging to the species *prunus Americana*.

The yield of native and cultivated gooseberries was very large. We picked about 25 bushels of gooseberries for the home market.

In western Minnesota, the orchard should be located on low ground instead of the highest ground on the farm, and, if possible, on land sloping toward the north or east, protected by a good windbreak on the south and west sides, if not all around. The trees should be planted at a sufficient distance from the windbreak to avoid all danger from being broken down by the snow, and the roots of the trees should be covered with mulch in the fall and winter. It may be well to place a box about the trunks of the young trees, and to fill them with earth, although our trees appear to be healthy and are doing well without ever having had this protection.

The branches on our trees are quite low, some of them when loaded with fruit having their tips on the ground. Those trees that have the main part of their foliage on the south and southwest sides have the healthiest trunks, grow and bear the best.

Now the fact that small fruits, crabs, and Duchess apples are successfully grown in Lincoln County, by persons with little experience in fruit growing, on a location and soil not best adapted to orcharding, and with the smallest rainfall and highest altitude in Minnesota, demonstrates conclusively that fruit can be successfully grown in western Minnesota.

CONDITION OF FRUIT GROWING IN CENTRAL MINNESOTA.

G. W. HOLMES, GLENCOE.

Mr. President, Ladies and Gentlemen:—I have thought it best to confine my remarks to my observation in the counties of Sibley, Renville, McLeod and Wright. It has been claimed by many, and even by some members of the Horticultural Society, that we could never grow apples successfully in our part of the state. In order to disprove such statements I shall give a detailed list showing individual trials and success, together with name, date and place. I do this, believing that individual effort plainly shows what our country is capable of and what can be done in the line of fruit growing. I have lived in the vicinity of Glencoe for the past twenty-seven years and my own success, in a small way, confirms me in the opin-

ion that in our part of the state we shall not only grow an abundance of small fruits, but that every farmer may, with little expense, provide his family with all the apples needed.

This district is pretty far to the north and west. In fact some of the persons that I mention live north of the line that marks half way from the equator to the north pole. For that reason I have thought it best to mention but one instance of *peach* growing and this one instance I mention out of regard for our old friend, Col. Stevens, as they are grown not far from his old home. We all know the colonel would not live in a country that could not grow *peaches*.

SIBLEY COUNTY.

Martin Brandlin, Arlington, Minn., has Early Strawberry, Hyslops and Transcendents bought in 1867, still in fair condition. Mr. Brandlin states he has had what apples he needed for his family nearly every season for the past eighteen years.

Wm. Hamilton, one mile south of New Auburn, has one Duchess that bore five bushels the past season. It has borne eight crops,and he says it bids fair to live forty years.

Daniel Munroe, one and one-half miles southeast of New Auburn, has a few fine old trees, also a number of evergreens. Mr. Munroe set six Peerless in the fall of 1890 and reports the remarkable growth of three feet the first season. Has set Duchess and Faribault the past fall.

John Rose,section 26,New Auburn,has six Whitneys, and a few Hyslops that are free from blight and bore a fine lot of apples in 1891. Mr. Rose waters his trees in dry weather and thinks trees will not blight if ground is kept moist.

Mr. Sully, section 36, New Auburn, has a fine garden and his one Duchess has done quite well, the tree being fifteen years old and still producing. Transcendents, Hyslops and one or two others are in fair condition. In the season of 1890 he sold ten bushels of Long Bunch Holland currants, and says they have proved the best that he has ever had in that line. Of raspberries the Marlboro has done the best; of black caps he thinks Souhegan good enough for him. Of several varieties of grapes he thinks the Concord and Champion the best that have borne fruit.

Martin Kutzway, section 36, has a seedling that looks perfect, thirteen years old and has borne several crops. It is a fine, sound looking tree and has never had blight nor killed back. Its fruit is medium size and fair keeper. He also has one-half acre of currants and gooseberries and tells me they pay better than anything else he has tried. He thinks Long Bunch Holland and Fay's Prolific currants and Houghton gooseberry good enough.

Adnat Shadniger, section 5, has Minnesota crab that seems to stand the climate all right, but is a shy bearer and fruits every three or four years. The Concord grape seems to do well with him.

Eli Drew, section 4, has six Transcendents, and two Hyslops; crop in 1891 fifty bushels; set in 1867; average crop for past fourteen years, thirty bushels per year. Trees in poor condition.

L. E. Wolf, section 3, has five Transcendents set in 1866 that look perfect, do not blight and bear every year. In 1891 he picked eleven bushels from one tree. Same tree produced ten bushels in 1890. He had Duchess

that bore eight crops but last July a wind blew it down. It was well loaded with fruit. Mr. Wolf prunes very close, allowing no sprouts to start on the limbs, and thinks cause of blight is due to too much top for root to support. Whether correct or not he seems to have good success in a small way. Being anxious to grow apples he drove 170 miles in September, 1890, to see the Peerless apple tree. Being greatly impressed with its value he has planted all he could buy of them.

Fritz Lewis, Sec. 36, McLeod County, Town of Glencoe, has two Wealthy that were sprouts from the roots of the original trees, bearing fruit and they seem to stand better than the old trees. He also has a few Transcendents set some fifteen years ago that are in a fair condition.

C. F. Wilson, has a few fine Early Strawberry trees which he values very highly. They bear regularly and Mr. Wilson says they have done well with him. When asked if the trees were still sound he replied: "I don't know about that, but do know they still bear fruit, and when they show signs of failing I shall set more." Mr. Wilson is one of the substantial farmers of McLeod County, and his opinion is worthy of notice. He lives on prairie west of Big the Woods.

Wm. Johnson, six miles west of Glencoe, has Early Strawberrys. They blight some, but still bear a fair crop. He has a few nice evergreens which are doing well.

J. F. Crosby three miles north of Glencoe has a number of old trees and says he has raised some fruit for the past sixteen years. The old trees are dying out but he set some thirty young trees in fall of '90. Among them he has Peerless and one Catherine Kline sent to him by O. F. Brand for a trial. It made a fair growth in 1891, and the wood seemed to ripen fully, and it has gone into the winter in good condition Mr. Crosby states that Peerless did remarkably well also. Has four peach trees which have borne two light crops, but failed to ripen. Trees look thrifty, and I presume grow too fast to allow fruit to mature. He protects them in winter by building a fence around them, and filling in with straw, etc

Herman Banks, Section 18, Winsted Town, has five Transcendents that bore 45 bushels in 1890, and 60 bushels in 1891. They bear every year—slightly affected by blight. Location, bigh knoll, north slope; cultivates each year, plows close to trees, breaking many roots, but they seem to thrive on that treatment.

John White, Town of Winsted, section 18, has twenty Transcendents, set in 1873; they are troubled some with blight. Mr. White has had some fruit every year. The past season had about 80 hushels. Location, high land, eastern slope.

Mr. La Mot, near Mr. White's, has a few large healthy looking Transcendents. Show some blight. He mulches heavily with chip manure each fall. Has fair crop each year.

Christianson, Town of Bergen, section 22, has twelve Transcendents twenty years old; do not blight; prunes close; carry very small top. He claims thatby keeping the top small, watching and rubbing off all sprouts we will avoid blight. Crop of 1890, 40 bushels; of 1891, 35 bushels. Also has a fine line of small fruits. Reports Turner and Marlboro raspberries as fruiting finely. Houghton gooseberries and Fay's Prolific currants doing well. Location, high, sloping gently to southeast. Also has a fine lot of arbor vitæ and white spruce.

WRIGHT COUNTY.

Andrew Oarlia, Town of Franklin, section 8, has 800 bearing grape vines, heavily loaded in 1891. Concord, Worden, Brighton, Lady and Champion are among the varieties. Also has six Duchess apple trees bearing in 1891, ten years old.

Mr. Robah, three-fourth miles west of Montrose, has twenty-five evergreens fifteen years old. Four rods east he has six Duchess sixteen years old, that bear every year. In 1891 he had 26 bushels. Condition, fair South of the evergreens he has one row of seven Transcendents 18 years old; perfect condition, no blight; bore heavily in 1891.. Mr. Robah says, "They bear *every* year." Also has two Hyslops standing with evergreens and they look fine. Three years ago he set a young orchard, one hundred Whitneys, and fifty Hyslops, some 100 feet south of evergreens and old orchard. They are all alive and have made a remarkable growth. Quite a number of Whitneys had fruit this last season; also one or two Hyslops. They have a fine, perfect trunk of about five feet, with compact head and show that Mr. Robah is no amateur in the business. In line of plums the Weaver and Desota do the best with him. He has a fine lot of small fruits consisting of Concord, Worden, Brighton and Delaware grapes, Long Bunch Holland currants, and Houghton gooseberries he thinks good enough for his use. Altogether he has the finest young stock that I have seen in Minnesota. This shows what a man may have who has the energy and perseverance of Mr. Robah. In addition to this he has a farm of 160 acres to look after.

S. Ferrell, seven miles southeast of Montrose, has a seedling 18 years old. It has borne several crops; also has three large trees set 26 years ago. One measures 61 inches in circumference and is 30 feet in height. He calls them Siberian, but I think them Simons' Crab. Mr. Ferrell says he set the trees three feet deep, the roots resting in subsoil, and filled in level with surface soil. Set about fifty trees at the same time. They were doing well but a wind storm broke them down three years ago.

Mrs. G. W. Moore, near Buffalo, has a fine young orchard of twenty-four trees set four years ago, all doing well; had a number of grape vines that fruited last year for the first time; also has a fine lot of raspberries, all doing well.

RENVILLE COUNTY.

Hon. D. S. Hall, 6 miles northwest of Stewart, has a fine young orchard of apples and crab trees.

Ferdinand Wolf, two miles east of Bird Island, has some 25 trees set fourteen years; a few Duchess that have done quite well; Hyslops and Transcendents in fair condition, but have been troubled with some blight. They have not produced much fruit. Location, level ground south of a cottonwood grove. Mr. Wolf thinks he made a mistake in setting his orchard and will set another lot north of the grove as an experiment. Mr. Wolf has the finest line of mulberries I have ever seen. He raised them from seed sent him from Washington. They seem perfectly hardy and produce abundance of fine large berries each year. They are quite different from the trees that have been sold for $1.00 each in the vicinity of Glencoe. I made arrangements with him for a few young trees and will report more fully on them at some future meeting

Wm. Wolf, one and one-fourth miles south of Olivia, has a few fine trees set eight years. They have not produced much fruit, neither have they been troubled with blight. He also reports Desota plums as doing well at his place. In line of small fruits he reports the Turner, Marlboro and Caroline raspberries as doing splendid; Houghton gooseberries and Fay's Prolific currants complete his list. He says he has lost no money, as he raises all he needs for home use.

One-half mile south of Mr. Wolf's, I found a fine young orchard of 75 trees, all looking well. Location on high land, with east and north slope. The folks were not at home, hence I could obtain no information. Should judge the trees had been set five years. They have very low trunks, not more than two feet high where they branch; have a low, broad head on top.

I spent one night with Mr. Chas. Kenning, six miles northeast of Bird Island, and was surprised to see what he had accomplished in a few years. Mr. Kenning's location is nearly level, slight descent to the north I think. As I took no notes, I will write from memory. He has the finest young orchard, including small fruits, I saw in Renville county. There may be better, but if so I missed them. Weaver and Desota plum trees look very fine and bear fine crops. Mr. Kennedy informed me that he raised more than he could use each year. He mulches small fruits heavily each year. I much regret that I did not spend more time at his place and take a few notes, which I should have done had I any thoughts of writing an article for the meeting, at that time.

Scattered all over the four counties named in every neighborhood, are young orchards. And the number of trees planted within the past two years indicates that faith in fruit growing is growing stronger as the knowledge of the wants and capabilities of our section increases. A better knowledge of how to care for trees will without doubt produce the most gratifying results.

REPORT OF M. PEARCE, CHOWEN, MINN.

Mr. President and Members of the State Horticultural Society:

I will not be with you this winter. Will send you a report of my experimental station a little out of the usual form. Just imagine you are on my 15-acre lot on the east side of Lake Minnetonka, and we are about to take a stroll over the ground. Before starting take a general view from the house. A public road on the north, beyond that heavy timber, on the west a heavy grove of hard maple. Here, on the east, is a row of Russian mulberries that grew from cuttings, which fruited the third year. They are some 3 feet apart, all branched from the ground, 5 and 6 branches to each cutting; from 2 to 6 inches in diameter, and 12 to 14 feet high. If those cuttings had been 18 inches apart, stock of any description could not get through them. From what I know of the Russian mulberry, I think I am correct in saying that cuttings set 18 inches apart in a few years will make a good and substantial fence and produce abundance of fruit that makes as good pies as the blueberry and continue in fruiting for weeks. Birds will not molest other fruit as long as the mulberries last. Here you notice a little east of the mulberries are three rows of evergreens from 12 to 14 feet

high, beautiful beyond description, standing 12 feet apart. They consist of Norway spruce, white spruce and some balsam. They are a grand wind break and so ornamental. The history of those evergreens is as follows: I bought 1,000 three-year-old seedling evergreens, put them out, transplanted twice, sold 800—here are the other 200. I have no recollection of losing a tree. The moral of those evergreens is this: Any intelligent farmer that lives on the prairie who will invest $10 in good evergreen seedlings, 3 years' old, put them out in nursery rows, give them good cultivation two years, then transplant them around a 5-acre lot on which his buildings are, in rows 12 feet apart, trees 12 feet apart in the rows, in a few years will have almost perfect protection from the intense cold, wind and blizzards, and, in addition to this, will add hundreds of dollars to the value of his land.

"Variety is the spice of life;" it is nourishment for the body, thought for the mind, and joy to the eye. The same kind of shade trees on the street becomes monotonous and tiresome.

Nothing is more attractive and pleasing to passers-by than a constant change. For that reason, to please myself and the public, I set out this row of white birch on the street. They are beautiful. More than twenty times the question has been asked me apparently in good earnest, how often I whitewashed them to keep them so white.

The hard maple is a native of Minnesota and is found in large quantities in different parts of the state; the trees are handsome, timber very valuable. Here is a grove principally of hard maple, put out 4 years ago, 6 feet apart each way, has never been cultivated; mulched with cornstalks, when put out, two inches deep over the whole ground, and each year since. They have made as good growth as the box elder on the same ground. For a few years after a hard maple grove is set out it should be mulched over the whole ground and not cultivated. As soon as the tops completely shade the ground the trees will make an upward growth like weeds. Nothing is so destructive to hard maples as bare ground and tramping over the roots. Adjoining me on the west 40 rods away is a grove of hard maple 14 years from the seed, that are now from 30 to 40 feet high, and from 8 inches to a foot in diameter a foot above the ground. The great value of the hard maple as a timber tree is not appreciated by the people of Minnesota.

Here are some old and new varieties of fruit trees: here is a tree from the root where the graft died; it is now 8 years old; has never been injured by blight, drouth, or cold; has fruited three years; ripens in August; quality of fruit first class; double the size of the Transcendent; sub-acid; color when ripe light green. I am growing this variety extensively to supply the lake trade. It has no name.

Here is a row of 25 Lieby that were grafted on the crowns of seedlings 3 years old in the ground; the cions made a growth of 4 and 5 feet the first season as straight as a candle. They were dug in the fall and buried, set here in the spring, have been out three years, made splendid growth, and are as sound as silver dollars.

This is the Tonka, a cross between the Cherry crab and Duchess. It possesses more good points than is rarely found in any one kind. It always roots deep; if there is any moisture in the ground it will find it, hence is seldom, if ever, affected by drouth; will live, flourish and keep sound on

the most exposed ground, where most other varieties kill or badly injure. The fruit is good, a bright red or scarlet color, and sells the quickest of all crabs. The vigor and vitality of this variety is seldom equaled. Besides growing this variety for fruiting I also grow them to top work the Wealthy and other hybrids on. Here is one four years old, an inch and a half in diameter at the butt, which I grafted with the Wealthy last spring—seven grafts in all. You see they made a growth of four feet or more in one season. I am top-working all my Wealthys on this variety, grafting in the limbs a foot from where they branch, and expect to grow Wealthy trees that will last as long as the Duchess Time will tell.

Here are two Duchess that are grafted with cions taken from a Minnesota seedling six years old that grows apples as good and that keep as long as the Baldwin. We think the seedling is hardy, It is covered with thorns three inches long from the ground a foot up the trunk of the tree. Above that the wood and leaves are very smooth. We shall keep quiet until we know more about the hardiness of this tree.

Here is a row of Lieby eight years old. They stand like iron fence posts. You can tie to them every time and they will not go back on you. The next tree is a new sweet hybrid six years old; a free grower: has never blighted or injured in any way; very prolific; as large if not larger than any other of the sweet hybrids; color red; quality very good.

Here is another hybrid 14 years old that has been pretty thoroughly tested in the Northwest, has never blighted or injured in any way; is the heaviest fruiter of any variety I ever knew; a little larger and later than the Transcendent; light green, sub-acid, very good, keeps a long time, not water-cored. We anticipate grand results from this variety. I call it the Arctic.

We have over forty varieties of apples and seedlings we are watching with much interest—but time will not allow us to pursue this subject further at present, as we have other things which we deem of interest. By the way, here are seven rows of Cuthbert raspberries running east and west, 40 rods long, 7 feet apart, hills 3 feet apart in the rows. In looking along these rows on the north side you notice stakes in the rows about 20 feet apart and three feet high, leaning to the north on an angle of about 50 degrees. On the upper side of those stakes, about 30 inches up, you notice a No. 12 white wire stretched and attached to each stake with a staple just tacked in sufficient to hold.

Resting on those wires you notice the canes that fruited last season; on the other side of each row you notice the new canes for fruiting next year are laid down and covered with earth. We find it a great improvement to reverse from one side to the other; by so doing the old canes can remain till spring. They catch and hold the snow, which is a protection to the roots and laid-down plants. In the spring with a heavy, sharp hoe the old canes can be cut close to the ground about as fast as a person can walk. We handle the black caps and blackberries in the same way, with the exception of the stakes and wires, those we no not use.

We mulch under the canes on the side they were laid down and let them remain as near the ground as possible; cultivate the other side. In this way we greatly increase the crop of each, also the quality.

We are now satisfied we can grow peaches and have the same success we do with the raspberry, with but little more labor, and shall plant out several hundred in the spring, life and health permitting.

REPORT OF H. J. LUDLOW, WORTHINGTON.

Mr. Ludlow: I have no regular report, Mr. Chairman, but I will give you a short synoposis of what has been done in my vicinity this year. I grew about two hundred bushels of apples and they did well; I have a patch of blackberries, probably three acres, and I supposed they were going to be a success, but we have had four years of very dry weather. The first year the vines were very fine. They were so high you could not see the horse's head from one end of the row to the other, but the dry weather has affected them materially. Regarding varieties I would say that the Snyder is a little earlier than the Briton, but buttons down so—as I call it—that I think it is almost useless to cultivate it at all. It only lasts about two weeks, while I pick from the Ancient Briton about six weeks, and last fall I picked and took to our fair a quart of berries in which thirty-two berries rounded up a good full quart. My experience is that they are the only berries for me to cultivate. With raspberries, I think for black caps the Gregg is the best, but it needs winter protection. I plant them three feet apart in the row, and I plant the rows seven feet apart. Before the dry seasons came on they did well. I have plowed up the Philadelphia entirely for they proved a failure during the last three years. I don't know whether it was the weather or something else. I have found the most successful red raspberry to be the Clark. It is the hardiest, and the fruit is as large again as the Turner, while it does not sucker so bad. In caring for my raspberries I put them seven feet apart, that is, the rows are seven feet apart, and they are three feet apart in the row. I cultivate them with a large plow drawn by one horse, and in the spring I wait until the suckers get up nearly as thick as weeds and then I turn a big furrow between the rows and keep going around and around and by setting the plow I can get within two inches of my row. When I came to Minnesota the only experience I had in fruit culture had been in grapes. I came from New Jersey where I was quite successful in raising grapes. I came here and tried some of Mr. Henderson's methods, but I find that I could raise five times as much fruit in New Jersey as I can in Minnesota. And I can raise five times as much wood in Minnesota as I could in New Jersey. I think that my grape culture is a failure as far as money is concerned. I find I can grow more grapes on one vine on the

southeastern side of my house, where it is protected, than I can on ten vines out on the trellis. I have a little five year old Delaware on the southeast side of my house and on it I grew 150 pounds of grapes in one summer. Now, I think if I get ten pounds on one of my vines on the trellis I am doing pretty well.

I paid a pretty good price for Russian mulberries. I got them from the Mennonites. They were recommended to me as a nice shade tree, and I tried them as such. I believe the Lord intended them to grow silk worms on. They grow very fast on our soil. I have taken off sprouts nine and a half feet long that grew in one summer. In the winter they freeze back almost as much as they gain in the summer. I tried for years to get them to grow up and got disgusted, and two years ago I took a saw and sawed them off at the top of the fence that I had built along there—it was a wire fence—and on the sides, leaving them only a foot wide and just about three feet high. When they began to throw out those sprouts I would go along before breakfast with a grass hook and trim them up, and now I have as fine a hedge as you could see. This year I marketed a hundred bushels of very fine plums at two dollars a bushel. The varieties were the Desota and the Ocheeda. The Ocheeda came from the banks of the Ocheeda. I saw them a few years ago and was struck by their beauty and size and pleasant taste. I saw them in the garden of a gentleman and was so struck by them that I engaged all he had. I have been cultivating them since, and they are really the finest plums that I have had by far. This is the one that Mr. Harris spoke of as taking the first premium at the state fair. It is a native plum which originated on the banks of Lake Ocheeda, and I named it the Ocheeda, myself. One peculiarity of it is that there is not a small plum on the trees, and every one of them is loaded, too. They come a little later than other varieties, and do not sucker as much.

A Member: Have you ever sprayed your plum trees?

Mr. Ludlow: No, I never have, and I have never seen a curculio on my plum trees.

REPORT ON GENERAL FRUITS.

CLARENCE WEDGE, ALBERT LEE.

The crop of apples the past season in our section was very light, and the price offered for summer home grown fruit unusually high; which, taken in connection with the heavy crop and low prices of the preceding year is a strong argument against allowing trees to overbear. A moderate crop each year, which might have been secured by thinning the fruit on the over-laden trees of '90, would have been of double the value for home use or market. The crop of '90, if thinned, would have been enough larger and more saleable to have made up for the loss in quantity; and every bushel offered on the market this year would have brought at least a dollar. The Wealthy, wherever bearing, is giving great satisfaction as a fruit; as a tree it is doing finely in some places. Was much surprised to find in an orchard near Geneva Lake two Wealthys, 19 years old, and measuring 22 inches around the trunk, that were perfectly healthy trees; their location did not seem particularly favorable, and the trees had been liberally manured. The Briar Sweet crab is much prized wherever it is fruiting, and seems to be very free from blight, and hardy. The Early Strawberry crab is also about as well regarded. The Malinda is beginning to fruit in a number of places in our county, and is attracting considerable attention. I have not had time to look up the state of the trees with care enough to make a fair report of their condition.

Plum trees, both wild and cultivated, bore an extra heavy crop. Thinned the fruit on my Desotas to about half the amount set, and still the trees were much overloaded, the fruit undersized, and all prospects for a crop next season ruined. These undersized Desotas were, however, so much superior to the wild plum, that they readily brought 25 cents per peck. when the wild were going slowly at 25 cents per bushel.

Grapes are a great success with the few who cultivate them. It was one of the few seasons that ripen the Concord to perfection; sold my Concords to the dealers at 5 cents, when New York grapes were retailing at same price. For a table grape and for market I am inclined to prefer Moore's Early. Its fine size and quality always command a quick sale. It is the only variety that has never failed to ripen with me. But a grape of its quality and earliness, that bears as well as Concord is greatly to be desired. The Lindley has always been a good grape with me, and this year did unusually well. We put away some twelve baskets of this variety for winter use. The method tried had the merit of simplicity, and the fruit, although shriveling some, retains much of its excellent flavor. Common grape and market baskets were used, a layer of excelsior put in the bottom, then a layer of grapes, a layer of excelsior, and a layer of grapes, until the baskets were full; over the baskets was tied a newspaper to keep out dust, and the baskets hung on nails in the cellar ceiling. Next time we shall try wrapping each bunch in tissue paper, hoping thereby to save evaporation and flavor.

Home grown grapes for Christmas and New Year's are not to be despised, and are clearly within the reach of every one who has a warm, sunny place in which to set his vines.

A demand is springing up among the farmers for evergreens for wind breaks. It is an auspicious omen. If carefully and honestly met and fostered it means shelter, warmth and beauty about multitudes of homes. It is strange that the nakedness of our dreary winter landscape should so long have gone unclothed, when the whole verdure of the pine and spruce lay as well within our reach as did their mighty trunks. But the day we trust is coming when the resinous odor, the cones and needles, and the towering walls of green, shall be about the homestead of every Minnesota farmer.

REPORT ON GENERAL FRUITS.

F. H. FIEDLLER, FERGUS FALLS.

Mr. President and Members of the State Horticultural Society:

I am very often asked the question, "Why do people up in your country not make more efforts to grow fruit?"

In this, my report as member of the general fruit committee, I will also make it an object to answer all such questions in as brief a manner as possible, to do the subject justice.

Some twenty-five years ago this portion of Minnesota was a vast wilderness, inhabited by roaming bands of Indians, semi-barbaric to savage in their habits, who subsisted on the abundance of fishes in the lakes and rivers; who chased the deer, elk and moose through the then seeming inexhaustable forests, and over rolling prairies. No houses, fields and towns! No sign of civilization! One vast wilderness! For centuries it was thus, until the hardy pioneers, the forerunners of civilization, found their way to this park region of Minnesota, and made their homes, amidst almost indescribable hardships; changed the prairies and timber openings to farms of great fertility, fitted to take the first rank among the agricultural countries of the world.

Soon after the sturdy pioneers were about settled down and had some patches cleared for fields, the first tree peddler made his appearance, with a bounteous plate book and a museum of monstrosities preserved in alcohol, selling northern grown nursery stock raised in Indiana and Ohio.

Everybody was eager to raise fruit, and the oily-tongued stranger asserted it was easy to grow not only apples and pears in this dry, healthy climate, but also peaches of long keeping quality, such as cannot be grown in the peach districts further south, not mentioning the numerous varieties of smaller and unimportant fruit. Well, to make a long story short, this public benefactor and promoter of horticulture (?) had no trouble in getting large orders for stock everywhere he came.

In due time the trees arrived, were carefully planted, grew well until fall, some even grew again the next year, and a few were four or five years old when they died, but soon the last trace of all of them was gone.

Peddler No. 1 was soon re-enforced by No. 2. This man represented a St. Paul nursery establishment. His samples and preserved monster fruit by far excelled those of his predecessor. He talked, and talked, and showed his beautiful plates, and at last left the country with as many orders in his books as there were farmers on his route. When the stock ordered arrived, the happy owner had to pay express charges from Missouri. The success was about the same as with the former order. They followed one another to the brush pile.

The same swindle was repeated over and over again, until people got tired of it, and the newest schemes failed to work well. People had become discouraged, and, one by one, they stopped buying trees, and the tree agents were very lucky when an order could be booked. Then a law was enacted by our legislature prohibiting trees from other states being peddled out in Minnesota. This put a stop to the nuisance for awhile, but I notice the old swindle is taken up again, but without much success.

This is the situation as I see it. No doubt in the last twenty-five years this part of God's footstool has undergone a great change. Where once the wigwams of the Indians stood, now stand fine farm houses, massive barns and well filled granaries, prosperous towns and cities, connected with railroads over which iron horses draw immense loads with the greatest ease and regularity. Telegraphs flash their messages with the velocity of thought. Where once the deer, bear and moose had their feeding grounds we now find herds of blooded stock and thoroughbred horses. Where the Indian youth played their savage games, we have erected schoolhouses, to teach our boys and girls those elements which they must possess to grow up enlightened men and women. Great are the changes that have taken place here. Civilization has worked wonders. Only one thing we lack here, good home-grown fruit.

Are we doomed to forever eat the shipped-in strawberry, apple and grapes? Will we ever grow our own fruit? So far we have not had any great success; but this does not prove that we shall not succeed in the future. In the past we have bought southern grown, unhardy trees and plants, and tried to grow them on the southern and eastern plan, and have very often failed.

We must introduce northern grown stock, or we must originate varieties adapted to our climate, and then we will succeed.

Now, I am elected a member of the general fruit committee and am supposed to tell you, at the anuual meeting of the society, what varieties we grow here, how many bushels, cases, quarts, etc., we raise, etc. Making such a report correctly, giving accurate information, is a very difficult undertaking, considering that five-sixths of all trees and plants are having names attached to them which do not exist; for instance, there were some apple trees sold at Perham, this county, some ten years ago, under the name of Hill's Northern. These trees turned out to be five or six different varieties of crab, some of them undoubtedly Transcendent. I know of another lot of crabs sold as Duchess of Oldenburg; and so you see, under these circumstances, it is almost impossible to give correct names. I never saw a standard apple grown in this county. Before 1885 we had quite a number of crab orchards, but since that fatal winter most of them have gone to the brush pile; yet, there are some fine orchards in the towns of Maine, Clitherall, and some other places. The crop in 1891 was very good.

Small fruits are grown with more success every year. The weather was rather too wet in the flowering season of strawberries, but in the eastern part of the county the crop was fair.

Currants and raspberries had abundant crops everywhere.

Grapes, blackberries and gooseberries are not grown here yet.

Native fruits fruited abundantly.

REPORT BY L. R. MOYER, MONTEVIDEO.

Judge Moyer: I have not prepared any written report. Perhaps I can give you in a few words a general idea of the condition of the fruit industry in our region. We do not succeed in raising many apple trees. A good many years ago I purchased some apple trees, but I think most of them have died. There are a few left yet with a few limbs living on the north side. The crab apples have all died but one or two. The name of one of them is lost and the other I think is the Maiden's Blush, and that gives us some very fine crab apples. We have not been quite successful with our plums out there, although some of the improved varieties have done pretty well. Last year we had a very large crop of currants, but our strawberries have entirely failed for two years. I raised some raspberries. Some of us have tried planting them in hills seven feet apart and laid them down, and taken care of them. A good many more have let them run wild, and my observation is that these latter people got a good many more berries. I don't know that there is anything further that I can think of. I noticed at Minnesota Falls, a few miles from our place, that the mulberry that was planted a few years ago seemed to be developing into a small tree. By the way, I will say in closing that I raised some grapes last year and they ripened very well.

Mr. Sampson: I want to say one word in regard to Judge Moyer's statement that the raspberry that runs wild yielded the largest quantity of fruit. I do not think the society ought to let that statement get out without the remark that the next year the yield would not amount to anything.

REPORT OF C. F. MILLER, DUNDAS.

Mr. President and Gentlemen:

I have been a resident of this county nearly 28 years. A partial review of the attempt at fruit growing for the last quarter of a century might be fitting and possibly of interest to some, at least. It is interesting to compare the present with the past once in a while.

From 1864 to 1872, there seemed to be quite an interest in planting apple trees, with some pears, cherries, etc. In one orchard about 900 apple trees had been planted in 1857. They had commenced bearing about the time of my advent to this state. Other orchards also, of from 100 to 500 trees each, were put out in those early years.

Of the varieties that lived to bear considerable fruit were the Red Astrachan, Early Joe, Duchess, Keswick Codlin, Saxton, Fameuse, Golden and Perry Russett, Tolman Sweet, Winesap, Ben Davis, Haas, Plumb's Cider and some others.

The Flemish Beauty pear and the Early Richmond cherry were fruiting to some extent in 1872.

The spring of 1873 found nearly every bearing apple tree dead excepting the Duchess of Oldenberg. But few of those varieties that succumbed to the behest of the great Frost King in that memorable winter of '72 and '73, were ever planted again in Minnesota. But the Duchess stood the pressure of that trying time most nobly, and some of the best of those Duchess which were planted out 20 years since, are still bearing, and promise fruit for a decade yet to come.

What was to be done? Was everybody discouraged? Many were, but we would try again, but this time with much more caution. Smaller orchards were set. The varieties reset were principally Duchess, some Haas, Tetofsky, Price's Sweet, Wealthy, Utter's Red, Malinda, Plumb's Cider, Peach and others, with a long list of the Russians. The most of these varieties did well till the spring of 1880, when it was found that Saxton and Utter's Red, with some of the Russians, were badly injured. A warm wave in October the fall previous, with 46° below zero Christmas morning, had done its work. The varieties left bore a good crop in 1882. The following winter being a very severe one did great injury to Price's Sweet and the Haas. They were practically *dead* when the spring of 1883 dawned upon them. Peach and Plumb's Cider, and the Wealthy were much injured but not killed. The summer of 1884 was a very fruitful one and everything that could bear did bear. With the Wealthy it was mostly their first or second crop. Late in September or early in October there came a hot spell, followed by unusual cold through December and January, and by the next spring (1885) all bearing trees excepting Duchess and Tetofsky were gone to the shades.

A Mr. J. G. Miller, of East Prairie, (no relation of mine) had a few Duchess seedlings that were in good condition, though they had borne for several years. I had myself said that I would not set out any more apple trees in Minnesota, but an opportunity came for getting some of his seedlings, which I then embraced, and in that spring (1885) I set of his seedlings two varieties, and some of the Whitney No. 20, Strawberry, Longfield, Duchess, Wealthy, Meader's Winter, Sweet Russet, and some other hy

brids, making something near an acre of an orchard. It began to bear in 1890, the fruit being fine. Last year it bore more heavily. Some of the trees were loaded with apples which sold readily in Faribault at 40 cents per peck. My trees are nearly all low-headed, the limbs coming out close to the ground. I find it more difficult to protect them from rabbits headed low in this way, as they cut the smaller limbs off and bark them, and thus so mutilate them that the limbs do not shade the tree so perfectly, sometimes, as they would when left intact. But still, for all this, I should train in this manner even if I had to fence them out. What is the sense in a long trunk that you must "shade," or "box," and fool with in other ways, which is as useless as a tail on a toad anyway. Your tree is, after being "boxed," just as vulnerable to injury by sun scald as mine is without being "boxed." The Wealthy apple is of such fine quality and a fair keeper that I shall raise some of them if the tree is half hardy. One trouble with it is—which makes it shorter lived—its tendency to overbear. I am experimenting a little and I think perhaps I am "getting on to it" to keep it back from its overbearing proclivities. It is a fact that apple trees, when grown in a partial shade, will not bear so well, neither will they kill out so much. I have some Wealthys in the shade, on the north side near to my Scotch pine wind break, which are ten or twelve years old, and are all *sound* and healthy, and bearing lightly every year, and they now look as if they would live many years longer.

In the fall of 1890, I procured some of the Peerless, after having examined several thousands of them growing side by side with the Russians and other varieties such as we all are planting; the Peerless were on the same stocks as the others. I saw no touch of blight on the former, not even one top bud that I examined had failed to grow, while many of the others were injured more or less. I can see around here that many have set out a few of the Peerless, and I learn that a very considerable many farmers throughout our county are setting out this promising variety.

Last summer, when apples were nearly at full size, there came a ferocious wind from the south that blew off nearly all the Duchess, and the larger apples. As my orchard was well protected on the south by two heavy rows of Scotch pines, the apples were all on the trees after the wind, while one of my neighbors said that it blew off every apple from his Duchess trees. If we wish to raise fruit, we *must* have some sort of a protection to break the force of these howling fierce winds, especially on the south and west sides of our orchards, for it is as necessary in summer as in winter.

The past attempts at fruit culture have indeed been most disastrous and discouraging in a superlative degree, almost enough so, seemingly, to dishearten everybody; but we never can and never will judge the future by the past. The faint heart never wins the fair lady. The good work of producing thousands upon thousands of new seedlings by hundreds of intelligent experimenters, by cross fertilization, has gone on till now we have in our possession an almost countless number of new young nursery trees that we think we can almost know will succeed here in our high latitude.

It cheers our hearts as fruitgrowers to "hear this tread of pioneers," of *orchards* "yet to be".

REPORT ON GENERAL FRUITS.

BY R. C. KEEL, ROCHESTER, MINN.

Mr. President, Ladies and Gentlemen:—I find that the interest in horticulture in the southern part of Minnesota is increasing more this last year than in any previous year. The plants and bushes came through last winter in good condition, and we would have had a grand crop of small fruit if the late frost in the spring had not destroyed a large amount of the strawberry blossoms and some of the blackberry blossoms on low land; but after all we had a fair crop and good prices. Of strawberries we have tried nearly everything, but have for the last few years been growing mostly Crescent and Bubach, fertilized with Cap. Jack and Jessie. The Jessie was hurt more by frost last spring than any other variety, but it is one of the best fertilizers we have and will pay to plant, even if we don't get any fruit from it. However last spring there was more land set out to Haverland and Warfield No. 2 than any other sorts. Those planted the previous year of these two varieties bore an abundant crop of fine fruit. Mr. M. W. Cook, of our city, who is cultivating about fourteen acres of strawberries, is planting more of these varieties than any other, and I do not think that anything better can be grown. Of black raspberries we have the Ohio, Tyler, Doolittle and Gregg. The Doolittle is the best in quality and as productive as any of them, but the berries are small and do not sell as readily as the Ohio; hence we are planting more of the Ohio than any other. The Gregg are the largest of them all, but is too tender to grow without winter protection and does not turn out as well as some of the other varieties. Our crop of blackberries was good, except on the low land. The Ancient Briton are doing better than any other, but to lengthen the season we have the Snyder and Stone's Hardy. Currants were so plenty that they sold for five cents per quart. Grapes were the best crop we ever raised, both in quantity and quality, and all of them got ripe before we had any frost to destroy them. The varieties we are growing are mostly the Delaware, Concord, Worden and some of the Rogers. The Worden and Delaware are the most productive. My grapery contains five acres but has never done very well as yet; for while almost any man can grow strawberries and other small fruit, I find that for growing grapes lots of experience and skill are required. All my vines are twelve or fourteen years old, but have never been trimmed the way they ought to be. Last fall I started new vines, and shall train and trim them in a proper way. I have a row of Mulberry bushes that are fourteen or fifteen years old. They seem to be very hardy and make a good windbreak; have borne fruit for the last four or five years, but the fruit is not worth picking.

Of red raspberries we have Turner, Brandywine, Philadelphia, Cuthbert and Shaffer's Colossal. The Turner has for a number of years been our old stand-by, but the Brandywine are now gaining ground, and are considered the best and most productive. The Shaffer's is a good berry and very productive, but on account of their color they don't sell well.

The apple crop was, in many orchards in our county, a good one. As to my own orchard, the yield was not over a half crop. Most of my Duchess trees took a rest and made a good growth, and are full of fruit buds for next year's crop. Duchess, Wealthy, Longfield and Malinda are the kinds mostly cultivated; and of crab apples we have an abundance. Transcendent, Hyslop, Orange, Virginia, Florence, and others of the Gideon family are the best. Each year we ship from our town hundreds and hundreds of barrels of crab apples, mostly to Dakota and Minneapolis. When handled and shipped in good condition they bring a good price, from 75 cents to $1.00 per bushel.

The rules for growing small fruit are as simple as those for growing a crop of corn or potatoes. For strawberries a southern slope of sandy soil well manured is to be preferred, but any kind of soil will produce a crop. In planting I use a line as a guide to get the rows straight. For the last couple of years I have used a spade for planting. Insert the spade close to the line 4 or 5 inches deep, work it back and forth once or twice, having a boy with the plants ready; as soon as hole is made the boy will hold the plant crown even with the surface till the man again puts the spade in the ground, pressing it gently toward the plant, putting his foot between the spade and the plant. This is the quickest way of any I have tried, and can be done as well as when planted by hand. Strawberries should be planted 3½ feet between rows and from 12 to 18 inches in the row. Plant 3 rows of pistillate, then one row with perfect flowers; cultivate at least once a week, using a fine tooth cultivator, and keep the rows clean by hoeing or weeding; pick off all the blossoms the first year. In the fall when the ground is frozen enough to hold up a team, cover them with clean straw, rye straw if possible, and the work is done for the first year. In the spring when all danger of frost is over, rake off most of the straw leaving it between the rows. If the bed has been well attended the first year, no more work is required till after picking season is over. Black raspberries and blackberries should be planted 3 feet apart in the row, and 7 feet between rows. Dig the plants when they are a few inches above the ground and plant them the same way as strawberries. The first year a row of strawberries or potatoes can be planted between each row. When the young vines are about 18 to 24 inches above the ground pinch the ends of them off, to make them grow stocky and produce more laterals; these laterals on black raspberries should again be cut back in the spring to a length of 12 or 18 inches.

The blackberries should not be trimmed in the spring at all. The blackberries sprout freely and will become troublesome if not cut down and treated as weeds. They should be covered during the winter with earth; it should not be done till the ground is about to freeze up. To do this loosen the dirt on the north side of the plant with a potato fork, bend the tops over towards the ground, and cover with earth. It is not necessary to put on a great deal of earth, just enough to hold them down. After danger of hard frost in the spring is over, the bushes should be taken up. This is easily done by putting a fork under the plants and lifting them gently up. From my own experience, I find that blackberries can be grown with profit on poor land. I have a blackberry patch on a stony side hill that would not raise a crop of corn or potatoes, and I get more berries from that patch than from those planted on a deep loam.

Red raspberries should be planted in rows four feet apart and 3 feet in the row. The tops of them should be pinched off when they are 18 or 20 inches high, but no further trimming should be done, except removing the old wood in the spring or fall, leaving not more than 5 or 6 new canes in a hill. The Turner and Philadelphia will stand our winters without any protection, but the more tender varieties, such as Shaffer's, Brandywine and Cuthbert, should be covered the same as blackberries.

In a country so well adapted to small fruits as Minnesota, it seems as though every farmer should raise all his family could use—it requires but a little piece of ground. The good work that our Institute did last winter helped greatly to improve the interest taken in this line of horticulture.

DISCUSSION.

Mr. Harris: I would like to know why every man that ever gets up or reads a paper on this subject sets the rows three and one-half feet apart? Now, in order to pick them right, you must have an alley in between these rows of a certain width. They can just as well take a six inch wider space and make it four feet when they plant them. Yet, every book and speaker and everybody else says "put the rows three and a half feet apart." Now, I put them four feet and sometimes four and a half feet apart. I can then run the cultivator and put it in once or twice more by so planting them.

Mr. Wilcox: It seems curious that an old horticulturist like our friend Harris should recommend planting them four feet apart, because that seems to me altogether too near. In our modern methods we are always making some improvement on the past. This recommending strawberries to be planted three or four feet apart—varieties that under favorable conditions will throw out runners that will cover the ground the first season—is undesirable. I also criticise the recommendation to set raspberries four feet apart. I would not set them nearer than seven feet apart, and I think if he would leave at least six or seven feet between the rows, that he would get a more satisfactory crop.

Mr. Keel: In regard to Mr. Wilcox's suggestion I would say that I only plant my red raspberries three and four feet apart; my black raspberries I plant seven feet apart. I think I can grow a good crop of red raspberries by planting them three and four feet apart.

Mrs. A. A. Kennedy: I plant my rows seven feet apart, and when in bearing we cannot get through between them without knocking the berries off.

Dr. M. M. Frisselle: My raspberries are planted six by six. I think Mr. Keel's recommendation to plant them as he does is altogether too near.

A Member: What varieties do you recommend?

Mr. Keel: I recommend the Turner and Brandywine. I have grown the Philadelphia but do not recommend them. I think the Brandywine is the best.

Mr. M. A. Thayer: My custom has been to plant red raspberries seven feet apart, and I do not find any too much room between them then. I plant them about three feet apart in the row and the rows are seven feet apart.

REPORT ON GENERAL FRUITS.

SETH H. KENNEY, MORRISTOWN.

This is a memorable period of a society which has probably experienced more failures than successes, but whose out-look in some respects looks brighter now than it has at any time during the past. As long as good orchards are an exception, we shall be assured that there is abundant work for the horticulturist in Minnesota. Much of the experimental work with many varieties is over, and new seedlings are coming to the front. As far as my observation extends, there seems to be more confidence in planting orchards, and a great many have set out trees the past year.

One year ago last October I became convinced that I could raise an orchard by boxing trunks and filling the boxes with earth and letting it remain there. I planted out very late that fall four hundred trees of the Duchess and Wealthy. Now for the result: All but one of the trees are alive and bid fair to make an orchard. Part of the trees I mulched; part were without any mulching. I noticed the trees mulched made the best growth. Wishing to learn the real difference, I measured the best growth on one row of mulched trees, which numbered 26 trees; the average growth was 19 inches, while an equal number of trees not mulched averaged 13½ inches, making a difference in favor of the mulched trees of 5½ inches. Of the trees that were boxed, not one of them has been molested by rabbits, although the tracks show that they have been among them. I am well pleased with the boxing, believing it will keep the trunks in a healthy condition, and think with the mulching we will see good results; believing if the roots and trunks are both protected, the limbs will take care of themselves.

For a great many years I have grown raspberries. I have had better success with Shaffer's Colossal than with any other berry. They are a large

red variety, or rather purple, rather soft when ripe for market, but excellent to can. Very rarely a productive one propagates from the tips, but owing to dry seasons I have not been able to get plants. Plants are best secured from plants set the first year. A few years since I bought 100 plants of the Windom dewberry. Perhaps I do not know how to grow them. They were planted out in rows 3 feet apart, I never have had any berries from them, and I hope some one will tell me what is the matter.

I had the pleasure of looking over the experimental station at Owatonna the past year. I have a great deal of confidence in the work that is being done there. Some of the seedlings have shown a remarkable growth, and if some of them do not show up well I shall be disappointed.

In company with John P. Andrews of the Faribault nursery last fall, we visited the Peerless apple tree growing on the farm of J. G. Miller in the town of Richland. We gave it a very careful examination. One of the lower limbs had been sawed off close to the tree. Another limb just above the one that had been cut off was so near dead it might as well be cut off, as it is kept alive by one-half inch of live bark. We are ready to endorse the committee's report, that was given in the winter of 1889, that "it is not a sound tree," but we consider it a valuable tree, with the exceptions made, and I think it the best tree of large apples that has borne well so many years that I know of. If it will do as well grafted on other roots, it may prove of considerable value to Minnesota.

Mr. Miller has a large healthy crab tree that we both admired. He said it bore heavy crops of excellent fruit and never blighted. This tree was beautiful in form and perfectly sound. We did not see the fruit.

DISCUSSION.

Judge Moyer: I would like to ask if anybody has had success with the Windom dewberry or any other dewberry?

Mr. J. A. Sampson: I will say that Mr. O. H. Modlin, of Excelsior, has grown the dewberry. I have seen the berry on his premises, and it is a very nice fruit. They were put up on trellises and seemed to be quite abundant and of good quality and size, but I cannot speak as to the profitableness of their culture.

Mr. Harris: I would like to ask Mr. Kenney if he took any of the boxes off the trees this summer and examined the trees inside the boxes.

Mr. Kenney: No, sir, I did not. I will state, however, that over a year ago when I took the banking away from some of the trees that there were no roots started out at all and that is what gave me the confidence to box the trees as I did.

Mr. Harris: Now, if the earth being on that tree during the summer would not have a tendency to cause it to throw out roots, it is a grand thing. It is an honest fact that the trees

that I banked grew better than some trees that I have in the same lot that were treated after my usual custom. I think that these trees that were boxed made double the usual growth, and I think it is a good thing. I believe that if people would practice it, at least until their trees got so large that the trunks would be shaded by the top, that their orchards would succeed a good deal better.

Mr. Dartt: I believe that the box will take a great deal of labor—lots of it—and that it won't make trees hardy; that when they get up and grow away from the box, the tops of them for instance, that the hard winters will kill them just as quick as though they had not been boxed. I have no doubt but it will be a protection for a season, but you must have the hardy tree or else there is no use in bothering with it.

SUGGESTIONS AND FRUIT REPORT.

BY M. PEARCE, CHOWEN.

Mr. President and Members of the State Horticultural Society:

I am one of the committee on small fruits, also on general fruits and am expected to say something as vice-president. As they all cover about the same ground I will group them all in one paper. I am at a loss to know how to make a correct report. Could make two reports on the same subject and think they would both be right, and as different as good is from bad. To illustrate this, take the soil and locations around Lake Minnetonka. They are naturally adapted to growing fruit of nearly all kinds. The people around the lake are mostly engaged in growing fruit of some kind. There are those that have good crops of all they try to grow, from the strawberry up to the apple and peach, while others with soil and location just as good, make perfect failures. These two classes of fruit growers are found in all countries. The latter largely predominates in all sections, but more particularly in a country where successful fruit growing requires the greatest care and attention, such as Minnesota. In our common and graded schools, where we have good, honest and conscientious teachers, and I am pleased to say we have many such, to all dull or backward scholars they give extra help between school hours. They often become the brightest and best of their classes.

It is our duty as a state institution of horticultural teachers, to bestow the same acts of charity on individuals of the less fortunate masses of the agricultural districts. To accomplish this we will make the following suggestions, and hope the members will see it in the same light and be prompt to act: Take horticulture out of the farmers' institute—

it has plenty to look after without horticulture. Establish a horticultural school at each institute, the same as the cooking school last winter. Have those to teach that understand Minnesota horticulture. Let one take trees of all descriptions, one small fruits and flowers. In this way an immense amount of good can be accomplished.

If any one makes objection to the suggestions we have made, please answer the following questions: In this railroad age, how long would a church live without a Sabbath school? How long would the churches hold their influence over the human race without the aid of the Sabbath schools and the Young Men's Christian Association? We occupy the same position as do the churches. To accomplish our ends we must keep up with the times. A school of horticulture would greatly increase the attendance at the institutes.

Now the small fruit report. Strawberries that were not mulched and taken care of, as a general rule were a failure on account of late frost and unusual drouth. Some careful growers had good crops of fine fruit. On my own ground out of twenty or more varieties for standing the drouth and producing a very large crop of fine large fruit, the Warfield beats all other varieties badly. The Warfield, Crescent and Bubach I consider three of the most valuable varieties for Minnesota; for fertilizess, Michels Early and Wilson.

The raspberry crop was good. Plenty of rain before the fruit was injured. Of the reds, we think the Hansel the best for very early and medium; Cuthbert for late. The Hansel is far ahead of the Turner in every particular. Black caps—Souhegan for early, Ohio for medium, Gregg for late.

The blackberry crop was good. The Snyder and Ancient Briton take the lead. The Ancient Briton has not been doing as well as usual. It is becoming very subject to fungi. On my own ground two-thirds of the fruit did not ripen. The foliage of the Snyder is perfect and fruit fully up to the Snyder.

GRAPES.

The crop was the largest and finest that was ever grown around lake Minnetonka. Owing to the dryness of the season the leaves were comparatively free of disease. Nearly every variety is grown. All have some good qualities. The Concord has the most and takes the lead by far in market. The Delaware is a fine grape for eating and meets a ready sale.

Fruit trees of all kinds are doing well with the exception of the blight among the crabs. But little fruit the past season. Trees did not blossom.

REPORT ON GENERAL FRUITS.

M. C. BUNNELL, ST. PAUL.

To the Members of the Minnesota State Horticultural Society:

My report will be brief. I am sorry that I cannot be with you at the quarto-centennial meeting, which, no doubt, will be interesting to all horticulturists. I think we can look back since the organization of our society and see that there has been great advancement in horticulture in Minnesota.

The growing of standard apples has been discouraging to many, owing to their lack of knowledge regarding right location and soil best adapted to them, and the consequence is, they stand ready to condemn Minnesota as an apple-growing state.

My experience has led me to believe that a north slope is the best. If you can't get a north slope, select an east slope. What we want is to prevent the flow of sap too early in the spring. Then I would recommend a heavy clay soil in preference to any other, so as to give the tree a steady growth, so the wood may ripen well before winter closes in. If one has not a hillside, then mulch the trees heavily and keep the frost in as long as possible.

Now, as to the blight, it is a mystery what causes it. Various opinions are formed relative to it. A Mr. Masterman, of Oakdale, Washington Co., tells me that trees whose roots run close to the surface blight worse than those whose roots run deep into the ground. If that thought be correct, then I should think good heavy mulching would prevent it in a great measure. My idea would be to have the orchard located on high ground with a clay soil and a good circulation of air. The trees would not then be so likely to succumb to the ravages of the blight.

The Transcendent seems to suffer worse than other varieties, although I have noticed the blight among the Whitneys and Wealthys. The Duchess still takes the lead as a hardy tree, and in many locations in Washington and Dakota counties they produce well. The Early Strawberry is appreciated by all those acquainted with the fruit. The planter wants a few among his varieties. Some Minnesotas are planted. The Okobena is being introduced, and the farmers are trying a few of them.

Mr. Adam Saches, of West St. Paul township, Dakota Co., reports to me picking 123 bushels of crabs from twelve trees, mostly Transcendents. He marketed them at St. Paul, receiving from $1.00 to $1.50 per bushel. His Duchess brought him $1.00 per bushel. I don't see how any one can claim that it does not pay to plant fruit trees in Minnesota.

Herman Kernkamp, of Woodbury, Washington Co., reports his Wealthy trees bearing well the past year; his Whitney blighted some. His Desota and Weaver plums bore a fair crop and brought him a fair price, notwithstanding the abundant crop. I noticed the little green lice infested some of the trees.

The warm weather we had in September ripened the grapes so that there was a very good crop.

Currants were prolific with some. The Smith Bros., of Inver Grove, Dakota Co., marketed 175 bushels at St. Paul, at an average price of $2.00 per bushel. They give their plantation good cultivation, and while others had their crop destroyed by the worm, they attended to theirs by applying some remedy. I should judge they had an acre.

Raspberries and strawberries produced very well, the latter especially being much better than two years previous. The Jessie and Bubach are being planted to some extent, though the Wilson and Crescent are the leading berries.

Blackberries and dewberries are planted some.

The planting of evergreens is receiving more attention every year among the farmers, as is also the planting of deciduous trees and shrubs.

Judging from what I can see, I think the citizens of Washington and Dakota counties are on the right road to enjoy the luxuries of fruits and flowers, blessings given to us by an All-wise Being. Let us be steady workers in horticulture, for it helps to promote wealth and happiness.

REPORT ON GENERAL FRUITS.

J. C. KRAMER, LA CRESCENT.

I hope you will not be discouraged by my short and feeble report. In regard to fruit, my report is as follows: The crop of apples was splendid on most high lands where the open air could strike them, but in the valleys it was poor. On Caledonia Ridge there was a full crop of apples. The show of apples at the Caledonia fair was very fine. There was one plate of apples which was called a seedling, that attracted great attention. They were a grayish colored apple of perfect form, some four or five inches in diameter. After inquiring of the young man in charge of the exhibit, I am unable to learn its origin, but understand that the tree is healthy and thrifty. I will report upon it further at some later time. I have the promise of a few scions from the tree.

On my own place I have five seedling apple trees, crosses of the Transcendent with the Tolman Sweet, bearing for the first time this year a fruit beautiful in form and color, some of which is yet in my cellar. From the same planting of seeds I have also four trees bearing sweet apples, one the size of the Transcendent and the others about double the size, perfectly hardy and thrifty trees.

Plums were plenty in market this year, some of excellent quality. All my wild plum trees bore well. The Emerson plum did not produce much fruit. When in blossom they were attacked by mildew and an insect that curled up the blossoms and leaves, so that the trees were naked of leaves for about two weeks. Will some one please tell me in the next report how to prevent this mildew and the ravages of these insects?

A good many of the young seedling apple trees from the Excelsior experiment station are doing finely, and others ought to be grafted, as these trees are very healthy to graft on.

Blackberries were a fair crop without extra care, and raspberries were unusually fine. The Ohio is with me the best of the black caps.

Strawberries did not turn out as well as was hoped at the blossom time, as the weather was too wet. I have about four acres of the Princess for next year's bearing and plenty of young plants on hand.

VICE-PRESIDENT'S REPORT FOR THE SECOND CONGRESSIONAL DISTRICT.

DEWAIN COOK, WINDOM.

The season of 1891 was one of encouragement to fruit growers of this district. The strawberry crop was almost nothing, owing to late spring frosts. Currants, gooseberries and raspberries, both red and black, were far better than usual, with market prices very satisfactory. Blackberries are but little grown here, but wherever they received proper care, the Snyder variety produced very fine fruit the past season. The blackberry is not one of our profitable fruits.

Grapes were a light crop, owing in a measure to spring frosts destroying some fruit buds, and later on taking much of the bloom. But where plenty of wood was left, the crop was fine.

Plum trees were unusually full of bloom, at which time we had several frosts, and it seemed as though we should get no plums; but the frost did no harm to the plum blossoms whatever, and we had an extraordinary crop of both the wild and cultivated varieties.

The yield of apples and crabs was very good, the Wealthy and Duchess giving the best satisfaction. As to the prospect of the coming season's fruit crop, I will say that at the time most of us were setting out our strawberry plants, the ground was very dry and a large per cent of the plants refused to grow, and it is very probable that the crop will not be over-abundant in this section the coming season

Raspberries, both red and black, are promising. The canes made a stronger growth than usual the past season, with but few marks of the snowy tree cricket or other insects upon them. I think the plum crop will necessarily be light the coming season. As to apples, I can hardly say, but with the favorable winter we are having, the prospect is certainly cheering.

The interest in horticulture is increasing. There is a greater demand for fruit trees and plants than ever before, and we hardly ever hear the stereotyped expression, "You can't raise fruit in Minnesota."

REPORT OF VICE-PRESIDENT L. R. MOYER, MONTEVIDEO.

Judge Moyer: I have not very much of a report to make. In regard to the fruit list I would say that I believe that it has already been made. If desired, I might make out a list be-

tween now and to-morrow. I am glad to report that there is a growing interest in horticulture in my section of Minnesota, especially in the direction of small fruits. I have made some study of the small fruits of that region and my ideas upon that subject have already been presented, and the same subject has been fully covered by Mr. Harris in his report. I was interested in what he had to say about the choke cherry. I believe the choke cherry has a promising future before it. I received from Prof. Budd last spring a number of plants which I understand are the choke cherries of Europe. I don't know whether all the members of the society know how it grows or what fruit it bears.

REPORT OF VICE-PRESIDENT J. O. BARRETT, BROWN'S VALLEY.

J. O. Barrett: We have a pretty hard struggle to get along in our section. We have to contend with the fierce wind from the polar region, and the simoon from the south. And teh difficulties are increased because of our lack of forests. Next spring, our neighbors, the Indians, are to open their reservation, and if any of you want to capture some of the best land in the Northwest you will have the privilege of doing so. I do not know that I can give you any positive information regarding our success in the line of horticulture. We have a number of people who are interested in fruit raising, and we are in hopes to accomplish a great deal in that line in the future.

DISCUSSION.

Mr. Kenney: Can any member tell us something about the sand cherry?

Mr. Barrett: I am somewhat familiar with the sand cherry. It is a bush—a shrub—about three feet high. Some of mine are three or four years old, and are about an inch and a half in diameter now. They are very prolific bearers. In the spring, when they are in blossom, they are very beautiful. The flowers look like so many plumes waving in the wind, and are very graceful and beautiful. I think it is a beautiful shrub to have on the lawn. The berry is of a somewhat oval shape, and its color bears upon the black. They are very juicy and some of them are as large as a common size grape, I have noticed that they are very palatable, even when eaten raw.

Vice-President Wedge: Does it succeed on sandy soil?

Mr. Barrett: Well, we have the best soil in the country where I live, but it grows on any soil.

Mr. Harris: The Buffalo-berry has been talked of a good deal in the northern districts as being a hopeful candidate for improvement. I think it must be hardy because you find it very plentiful as far north as Bismarck and all through there. The fruit is about the size of the Red Dutch currant, and it is sour; perhaps I should say, at the seasons that I have seen it. There is beginning to be considerable inquiry about this plant, as it is also excellent when used as a hedge. It will turn stock when it gets as high as your head. I would like to ask Mr. Barrett if he knows of any nurseryman that has the trees for sale.

Mr. Barrett: I do not.

Mr. Harris: The trouble with the trees when dug up wild is largely one of pollenization. I think that it ought to be placed in our experiment station, and different methods of propagation tested as far as possible.

Mr. Barrett: I understand that it can be propagated from cuttings. Of course the soil must be moist in order to have it succeed.

Judge Moyer: I would say that John Louis Child, of Long Island, offers to sell the plants at the rate of three for seventy-five cents. He does not sell less than three at once, because he says that they are not of any use unless you have at least three.

REPORT OF COMMITTEE ON NATIVE FRUITS.

NOTES ON THE NATIVE PLUM AND OTHER NATIVE FRUITS BY J. S. HARRIS.

The subject of the wild native fruits of the Northwest was so ably and concisely presented at our last annual meeting by my colleagues, Dr. J. R. Walker, of St. Anthony Park, and Prof. C. B. Waldron, of the North Dakota Agricultural College, that I have but very little of interest to add to what has already been reported. I am glad to note that the interest in these fruits is growing and that they are considered of enough importance to attract the attention of the United States Division of Pomology, and that of many of the most learned horticulturists of the older states. Perhaps the native plum is receiving more attention than any other one of them. Since our last annual meeting I have had opportunities to become better acquainted with some of the varieties before reported upon, and to examine several newer varieties and seedlings.

THE GAYLORD PLUM.

I saw the Gaylord plum in bearing on the fruit farm of O. M. Lord at Minnesota City, last season. It was the second or third season that it had fruited in this state. The trees are vigorous growers of a spreading, irregular habit. They were loaded with fruit to their fullest capacity and some branches were breaking down under the weight of the fruit. The fruit is of a large size, many specimens measuring one and one-half inches in diameter. They are smooth, round, oval in form; when ripe the color is yellow, more or less blotched with carmine red, flesh golden yellow, rich, juicy and pleasant flavor; skin rather thick, but not acrid; belongs to the cling-stone class; origin, Floyd Co., Iowa; ripe last year from August 25 to September 5.

At the state fair there were in the Brown County exhibit three varieties shown as Penning's Seedlings. No. 1 was a large, round plum one and three-eighth inches in diameter; color, dark purplish red, deeply specked with small, gray dots; flesh greenish yellow; flavor sprightly good; shows a distinct suture on one side; is a cling-stone.

No. 2, large, oval, polar red, specked with gray dots; flesh green, good consistency; flavor good; stone rather large and nearly free.

No. 3, large, one and one-fourth inches in diameter; form nearly round; color yellow and red; flesh greenish orange, juicy, pleasant acid; stone rather large, thick and round; a cling-stone. Should judge that the conditions under which they had been grown had not been entirely favorable. In the Anoka County exhibit, E. S. Rogers showed two plates of plums that were said to be seedlings of a California variety. The fruit was large, round oval in form and of dark red color, flesh thick meated, rich plum flavor, stone rather large, flat and nearly free. Wm. Staples, of the same county, showed a variety, medium to large in size, round, color yellow, shading to bright red, flesh meaty, flavor good. On the second day of the fair, Miss M. H. Morrison, of Rosemont, placed on exhibition about one half peck of Morrison's Peach plums. It is a large, round, dark red plum with orange colored, very meaty flesh, of sweet, peachy flavor. It is nearly free-stone and when fully ripe the skin is easily pealed from the flesh. It is said to be superior for cooking and canning.

The Ocheeda plum from Nobles County, was also shown at the state fair and entered in competition for the best single variety of cultivated native plums, and was awarded the first premium, as being the best on exhibition. The fruit is larger than the Desota, and of excellent quality. Trees thrifty and abundant bearers.

Besides the above there were sent me by mail and express samples for examination from various places in Minnesota and South Dakota. Many of them were very fine, but none of them apparently superior to those already mentioned, and as my paper is growing too lengthy to be interesting, I will defer making notes on them until some future time. However, I will improve this opportunity to express my thanks and acknowledge my obligations to C. G. Patten, of Charles City, Iowa, Joseph Anderson, Renville, Minn., Dewain Cook and S. O. Taggert, of Cottonwood County, H. J. Sutlow, of Nobles County, and many others for the aid they have rendered me, and to W. A. Reed, of Fergus Falls, for samples of eight varieties originated from seed of the Chickasaw plum.

At two or three different times during the season H. Knudson, of Springfield, Minn., sent me samples of native gooseberry and chokecherries (*P. Virginiana L*). One variety of the cherry had stems from 4 to 5 inches long and containing about thirty fruits. The fruit is early in ripening and the most pleasant to the taste of any I have seen, being almost nearly free from astringency peculiar to that fruit. Another variety which he says is a cultivated seedling, has a short, compact bunch with much larger berries, (some half an inch in diameter) and very good for eating from the hand, although not quite as smooth in flavor as the other. I also found one tree in Houston County producing large fruit of a quality much superior to the common. An ex-soldier, who had seen considerable of northern Minnesota and the Dakotas, tells me that he frequently came across better than the ordinary types of this fruit, some of them being of large size and better quality than the best of the sand cherries. How shall we say that it is not susceptible of improvement or that it is not destined at no very distant day to occupy a prominent place in our pomology? In October I received from B. A. Mathews, of Knoxville, Iowa, a specimen of the native American crab apple that measured two and one-half inches in diameter, finer in texture and more beautiful in appearance than the Soulard. I do not expect that the coming dessert apple will be a descendent of this specie, but I do believe that it can be domesticated and ameliorated so as to become a desirable and useful fruit. It is both wise and prudent for us to test all fruits that the specialists of past ages and other climes have sought out and improved as food for man, and cherish and cultivate and strive to improve yet more all of them that can possibly be grown here. It is laudable in this fast age to search throughout cold Russia and other lands for fruit trees that for ages have been inured to cold, drouth and extreme changes, to produce fruit for our immediate wants. But shall we stop there? Wherever man resides we discover that nature has planted nutritious fruits that are adapted to the situation. We find scores of them indigenous to this Northwest. What are we here for? It is the province of the amiable genius of horticulture to explore and find these treasures, and to sow and plant, prune and propagate by selection of seeds, crossing, hybridizing, grafting, budding, cutting, layering, &c., &c.; and thus transform the oftimes acrid wildlings into rich, luscious fruits for the food and enjoyment of civilized man. If we of Minnesota are up to the advance of the age we will not hold back while others do this work, but will at once enter upon the work for all there is in it.

REPORT ON FRUIT BLOSSOMS.

O. M. LORD, MINNESOTA CITY.

April 28th, a few blossoms were to be seen on wild plums.

May 1st, the Cheney plum, under cultivation, partially bloomed, and a high wind occurring the pollen was nearly all destroyed.

May 2d, wild gooseberries and currants were in full bloom.

May 2d, the Ostheim cherry just beginning to bloom, but was not full till May 7th.

May 8th, Rollingstone plums were nearly full; the Desota and Miner just opening the buds.

May 9th, Luedloffs, Taylor, Cottrell and Rockford in full bloom.

May 9th, strawberries blossoming; also a few apple trees.

May 12th, blackberries and raspberries quite full.

REPORT ON SEEDLING FRUITS.

J. S. HARRIS, LA CRESCENT.

Mr. President and Members of the Minnesota State Horticultural Society:

The last season was not a favorable one for conducting the observations required of this committee, first, for the reason that in those portions of the state where the most promising seedling trees are located, it was an off year in their fruiting, some trees not bearing a single specimen and others producing sparingly. The little fruit grown on a tree in an off year is not generally sure index of the value of the variety and is more liable to show injury from insects, scab, etc. Second, because the winter of 1890 and 1891 was so mild and favorable in all respects that even the most tender varieties endured it well and no points could be made on their relative hardiness and adaptability.

Taking those circumstances into consideration, I concluded that I would not be justified in making any great expense to the society for travel and exploration. However, I have kept the work continually in mind and endeavored to keep in correspondence with such parties as have seedlings of any promise, and on the alert for any others that might be discovered. The results of such observations as I have made are respectfully submitted for the consideration of this meeting.

THE PEERLESS.

The original tree produced no fruit last season. It is reported as having made a good growth and promising a large crop the coming season. So far as I can learn, no young trees of the variety have yet borne fruit, but all of the young trees I have seen or heard of look promising and show no signs of blight upon them. In the nursery it is a prosperous grower and has a good root system.

The Patten Greening or Patten's Duchess Seedling No. 3, has not fruited as heavily at Mr. Patten's place as it did in 1890, but he informs me that both the bearing trees and the nursery stock are looking remarkably well. Such trees as I have seen of the variety have been entirely free from blight. It fruited with Andrew Peterson last season and he speaks very favorably of it. The specimens of it in his exhibit at the last state fair were even finer than I saw at Mr. Patten's place the year previous. Although it has never been given a boom, it appears to be grow-

ing in favor on its own merits and is being so widely disseminated that we shall soon be able to form a correct estimate of its adaptation and work.

I examined the original tree of the Avista, owned by A. J. Phillips, of West Salem, Wisconsin. It was carrying a good crop of fine fruit the last season, and considering the age of the tree, the many years it has fruited, its present condition and the appearance of younger trees just commencing to fruit, I should consider that it ought at once to be put on trial in all of our experiment stations. The Catharine (Kleine's Houston Co. seedling) did not bear very much last year. The tree is looking well, and the thirty bushel crop of 1890 does not seem to have impaired its vitality, although it is growing in timothy and clover sod. The Okabena fruited with me; trees are all doing well. It takes so well grafted or budded on Transcendent stocks, that if it proves hardy it will be very valuable for top working on that variety, where too many of them have been planted. A few varieties of seedlings of fine appearance were shown at the state fair of 1891. Andrew Peterson showed the Wolff and Anderson's seedling from Carver County. I have seen the tree of Wolff and should estimate it to stand in hardiness with, or a little better than the Wealthy. The fruit is very fair and will probably keep later.

Anderson's seedling is a fruit of medium size, flat-round in form, of a pale green color striped with dull red, flesh white and fine grained, flavor a pleasant sub-acid. Two varieties of seedlings were placed on the tables by J. M. Underwood, of Lake City. They were from John Murdock, of Wabasha County. Both varieties were of full medium size and fair appearance. No. 1 is nearly round in form, color yellow with blush cheek, flesh yellow and fine grained, flavor pleasant subacid, stem short, set in medium deep, broad cavity. Season, October. No. 2 approaches oblique-oval in form, color yellow, striped and blotched with pale and deeper red, flavor pleasant acid; the stem is long and slender, set in a rather deep cavity. Season, November or later. Besides the above, seedlings or unknown varieties were shown in the sweepstakes collection of Mr. Gordon, but I was not able to learn where or by whom they were originated, as Mr. G. was enjoined not to divulge secrets that might prevent some nurseryman from getting them for exclusive propagation—to corner the market—a great mistake on the part of the would-be propagators, for the day has passed when a boom can be raised on an unknown variety.

Some beautiful varieties were shown by Mr. Keel from the old Jordan orchards, whether seedlings or Russian I was not able to decide. At the Houston Co. fair a variety was shown that created a great sensation. One specimen weighed exactly two pounds (I did not see the fruit). On my return from the meeting of the A. P. society, I proceeded to hunt up the tree, but did not get a sight of the fruit (there were only seven specimens of it), as it had been used up. The tree looks to be about 10 or 12 years old and stands in a highly cultivated vegetable garden and shows no visible marks of having ever been injured by cold or heat. The crop of 1890 when gathered was one and one-half bushels. After another fruiting, if it proves to be a seedling and any ways promising, I will get it into our experiment station for trial. The work of hunting up seedlings and new fruits, and getting them into our experiment station for trial is a very important one. In my opinion, the coming apple for the central North-

west will hail from Minnesota. It must be a long keeper, as large and good as, or better in quality than the Wealthy, as hardy as the Oldenburg, and vie in beauty with the fresh, clear complexioned, rosy cheeked, fairest maiden of the North Star State—a fruit fit for the gods.

Every laudable means should be used to hasten its advent. It should not be left alone to individual enterprise or to a committe of this State Horticultural Society, unless our legislature should place more money at our disposal to bring it out. Its advent will be a boon to the state and nation, and it seems to me to be of sufficient importance to warrant us in asking of the Secretary of Agriculture the appointment of a special agent of the U. S. Division of Pomology for the State of Minnesota. I would recommend that this society memorialize Secretary Rusk and ask for the appointment of such an agent, the same to be a practical fruit grower of long experience, in harmony with the horticultural societies and experiment stations of this and adjoining states.

We should be allowed to select the man—not a man whose influence would count something in politics—not a broken-down nurseryman, or professional horticulturist who is out of a job, because he has made a wretched failure of every one he has undertaken; but one from among our soundest and most practical horticulturists, who has had a broad experience and made a success in business. One who is thoroughly imbued with the spirit of progressive horticulture, and is earnestly desirous of advancing the interest of all fruit growers and fruit consumers, *a leader in horticulture.* The appointment would be no advantage to the man. Financially he is better off without it. We should get him appointed and then stick by him as the Irish stuck by Parnell.

FRUIT PROSPECTS AT LAKE MINNETONKA.

DR. M. M. FRISSELLE, EXCELSIOR.

(*Read at the Summer Meeting.*)

The winter of 1890-91, though mild comparatively, was not in regard to some of the small fruits as favorable as many were led to believe. Though strawberries generally came through in fair condition, raspberries were, in many cases, badly winter-killed. The Turner, though considered iron-clad, was, in one or two instances that I have noticed, completely destroyed. In one case where the Cuthbert was laid down but not completely covered they were much injured, many of the canes dying after they were in partial leaf.

The strawberry crop has been better both in quality and quantity than in 1890, though the dry weather in May came near ruining it; but the timely and abundant rains did wonders in bringing forward a very fair amount of this delicious fruit. So far as I have been able to learn, blackberries are promising well, but the amount cultivated I believe falls far short of the demand. Currants are abundant, the crop being proba-

bly larger than has ever before been grown in the state; but the larger portion of this fruit is both inferior in size and quality, with prices to correspond, the best selling at $3 per bushel and the poorest at $1.

We cannot, under the most favorable circumstances, say much for the general apple crop about the lake, and this being the off year for this fruit comparatively few will be gathered during the coming autumn.

With regard to our native plums, we can only say that early in the season the trees gave great promise by their abundant bloom, but the crop did not set well and consequently the gathered crop will be small.

The crop of grapes will be the largest and best that has ever been grown about the lake, unless some unusual disaster befalls it. The vines seem to have fully recovered from the exhaustion consequent on mildew, and the large crop of fruit they vainly tried to ripen three years since.

As for the prices of strawberries and raspberries, they have been and are fair, in spite of the large amount of fine fruit shipped into our market from regions further south. As a promise of a large harvest of grapes comes to us from all sections of the country, both south and east, it is not probable that Minnetonka fruit will bring as large a price as it has during years past, but if we have a favorable season for its ripening and it be placed on the market in attractive and honest packages, it will doubtless bring remunerative prices.

REPORT FROM DEWAIN COOK, WINDOM.

(Read at the Summer Meeting.)

I send you a short report from this place this season.

Strawberry crop was about nothing, owing to late spring frosts.

The currant and gooseberry crops are fine. Grapes are promising.

The raspberrry crop is going to be large in spite of the snowy-tree cricket, selling at 15 cents per quart; will probably not go below 12½ cents.

Cherry trees are bearing some; Early Richmond doing finely.

The Russian Kruskaye (wild pear), grown by the Russian Mennonites, are, I am told, loaded with fruit.

The Russian mulberry is a sure cropper, and as usual are loaded, but the fruit is of value except as bird food.

The apple crop promises to be a fair one.

The plum crop is immense, both wild and cultivated. Some trees are unable to hold up under the load, and are breaking down. I have braced up many trees, but it is probable that many trees will be destroyed. I believe the Wolff plum, taking size into considration, is bearing a little the heaviest of any. I also have some Russian plum trees that are bearing a few plums. The plums are very large.

We are having rain in abundance; field crops are looking good.

Garden truck was mostly taken by cutworms.

ORCHARDS.

THE HIBERNAL AND LIEBY.

CLARENCE WEDGE, ALBET LEA.

The fact that the Hibernal is the only winter apple on our list for general planting, and that the variety is almost unknown to the average planter, has led me to think that a paper that would bring together the experience of those who have given it and its close relative, the Lieby, the longest trial, might be of value to the society. The confusion of names which exists, however, detracts greatly from the value of this experience, and I have been in doubt whether it would be best to present anything on the subject at this meeting or to wait until a comparison of tree and fruit would enable me to clear up some of this confusion, and write a more accurate and reliable paper. But hoping that the reading and discussion of my present material might contribute to this end, I have thought best to proceed.

Mr. Peterson, of Waconia, has two trees of Hibernal and two trees of Lieby, which are identical in tree and fruit, set nineteen years. With him the variety, whichever it is, has proved much hardier and healthier than the Duchess, and as free from blight, a vigorous grower, and a regular and heavy bearer of large, beautiful apples, which keep till January or February. Prof. Green reports Mr. Peterson as saying, "It is far hardier than Duchess. If we can't raise the Lieby, we had better quit the business."

Mr. Latham, of Excelsior, has one tree of the Lieby, planted fifteen years. It began bearing at four or five years; does not bear as much as Duchess, but fairly well; has blighted more than Duchess, but aside from this, is as hardy and healthy. In his opinion, it would not be a valuable market apple.

Mr. Sias, of Rochester, has had Lieby top-worked on Transcendent and Hyslop for about eighteen years. They made a perfect union, and were hardy and productive with him.

Mr. J. B. Mitchell, of Cresco, Iowa, reports as follows: "I know of no one in Iowa who has had the Russian apples as long as I have (since 1872). The Lieby is as free from blight, with me, as the Duchess, and more hardy; bears as prolific; a better keeper; as good a culinary apple; rather astringent for eating from the hand, but, when properly ripened, not as bad as it has been said to be. Lieby is the hardiest Russian. Lieby and Hibernal are practically the same." (See North Iowa Report, 1890, p. 47.)

Mr. Tuttle, of Baraboo, Wis., reports to me as follows: "Have had three Hibernal in orchard fifteen years; they frequently bear two years after planting; they bear better than Duchess, my trees in orchard having borne good crops nine years in succession; do not blight more than Duchess, and are much hardier—probably the hardiest Russian; they keep till mid-winter; a better cooking apple than Duchess; have never grown the Lieby, but have seen the fruit, and think they are the same as Hibernal."

With the exception of three reports which will be given farther on, these are all of the older planters that I have been able to hear from. The following are from those whose experience and observation should be of value.

Prof. Budd writes: "I have looked over our ledger record from many trial stations, and find both the Hibernal and Lieby, and four or five others of this family, perfect in tree, and regular and full bearers on varied soils, from the 41st to the 44th parallels. In sheltered spots, in low black soils, they have shown blighted twigs, but they are less subject to the disease than Duchess or any of the old list. Many do not agree that they are only fit for culinary use; if picked early and stored in a dark, cool cellar, they are better in quality than Ben Davis in January, if the somewhat astringent skin is removed. The proper rendering of the Russian name is Recumbent, and not Lieby, as given in the government list. The Am. Pomological Society has adopted the name Recumbent, and we should unite on this name. The name is appropriate, as the tree when of bearing age is peculiarly recumbent in habit, while the Hibernal has a more rounded top. In fruit, the Recumbent differs in having more color, and many think it better in quality, and a better keeper at the North."

William Somerville, of Viola, Minn., writes: "I am thoroughly convinced that the Russian apples are what we shall have to depend upon in Minnesota. Our trees of the Hibernal are seven or eight years old. They do not bear quite as well as Duchess, yet are good bearers; do not blight more than Duchess, and I believe are more hardy and healthy; its good keeping quality will amply make up for its poor eating quality. I hold it as one of our best winter varieties. I think the Lieby a little higher colored apple, and quite a little more acid than the Hibernal."

Mr. J. S. Harris, of La Crescent, writes: "My knowledge of the variety has been gained by observing it with others rather than by actual experience. In years past it has been almost impossible to get the trees, and I suppose the reason is because it does not make a nice nursery tree. In fact it is the hardest variety to make grow upright of any I ever got hold of. The Hibernal usually bears at six or seven years from root graft; do not think it as much inclined to overbear as Duchess, but from what I have seen of them I think them liberal bearers; they do not blight more than Duchess; and all the trees I have seen are more hardy and healthy. I think they will be profitable as a market apple. The Hibernal and Lieby may be distinct varieties, and I presume they are, but most of the Lieby I have seen I believe to be Hibernal."

Prof. Green, Experiment Station, St. Anthony Park, writes: "Our trees of Hibernal were planted in 1887; have not borne fruit; have never blighted. I think they are hardier and healthier than Duchess; we have

no Russians that appear hardier. I think the Hibernal is not quite as rampant a grower as the Lieby, but they resemble each other."

Mr. Patten, of Charles City, Iowa, who has had many Russian varieties on trial since 1877, reports the Hibernal as probably the hardiest of all. (See Iowa Report, 1890, p. 212.)

Mr. Haviland, Ft. Dodge, Iowa, reports a list of varieties blighting, and a list of varieties free from blight, and hardy, among the latter being the Hibernal. (See Iowa Report, 1890, p. 209.)

At my own place, near Albert Lea, three trees of the Hibernal, set in 1887, have been free from blight, and hardy, while the Barloff, adjoining them, and the Transparent, near by, have blighted seriously and fatally. The trees have been vigorous growers, and bore considerable fruit the third year, which, with care, will keep till January.

The above reports, it will be observed, are substantially in harmony, and indicate the same or closely-related varieties on trial. The three following, which, with the foregoing, embrace all I have so far obtained, are so much at variance with each other, and with the above, as to lead to the suspicion that they have been trying a different variety or varieties.

Mr. Keel, of Rochester, writes: "Have three Liebys, planted sixteen or eighteen years; began bearing at six or seven years; do not bear quite as well as Duchess, but are good bearers; neither Duchess or Lieby blight with me; on some locations they are as hardy and healthy as Duchess; on moist land they are not; it is a slow-growing tree, that spreads out more than any other apple tree. The young trees of Hibernal are not like my Lieby at all; they are more upright, and grow faster. My Lieby is a good winter fruit, that will keep till spring or later; it is not a large apple, is a flat apple, yellow in color, with a good deal of russet around the stem. From this time till spring they are a good quality and a good looking apple, that would sell well, and is of better flavor that Northern Spy."

Mr. Dartt, of Owatonna, writes: "Planted about 100 trees in nursery about fifteen years ago; they are called Lieby; did not get them for that, but at state fair they said the apple was the Lieby; one tree bore one or two light crops; did not blight any to speak of; do not know the cause of their death. The one that bore was probably killed in winter, but was not quite dead till summer; died six or eight years ago."

Mr. Brand, of Faribault, writes: "My trees were the Lieby, from the Dep., 1873; died with blight when about eight years old, but think they had previously been injured by winter; did not all die at once; think the winter of 1879 injured them badly."

It will be observed that Mr. Keel reports an apple different in size, color, quality and keeping, from that reported as Lieby by Peterson, Latham or Mitchell; that Mr. Dartt is by no means certain that he had Lieby; that Mr. Brand is the only one that reports the loss of a tree by blight.

ORCHARDING IN MINNESOTA.

WM. SOMERVILLE, VIOLA.

Our first experience was with the varieties grown in the Eastern states. They were acclimated to a damp atmosphere, and had a longer period from the first frosts which come in the fall until winter, giving the wood more time to ripen and get ready for winter. The change was too great to be made all at once to such a climate as we have in Minnesota with its dry atmosphere, hot summers, beautiful falls, and winter setting in frequently without much notice in the way of frosts, with the trees still growing and the wood not ripened. They would frost-bite the same as a corn stalk, the sap turning acid, and this circulating through the trunk of the tree would cause black-heart, and the tree would die.

Such winters as we had in 1884 and '85, with the cold wind from the north for three or four weeks in succession, the thermometer indicating from thirty to forty degrees below zero, froze to death all trees that had not been accustomed to such severe tests for generations past. I had a small nursery at that time, perhaps 10,000 trees, but they were all killed to the ground and consigned to the brush pile, except a few of the Russian varieties that were but slightly injured and some of them not at all, and to-day are in the orchard bearing fruit. The trees that I consigned to the brush pile were those, the scions for which I had cut from the best seedlings I could find that had stood the test for fifteen or twenty years. Some of the trees I cut scions from are yet living and bearing fruit, while all the young trees have perished. This proves to me that we cannot depend on any one tree of any of our American kinds as a parent to give us the fruit and hardiness of tree that we want. It requires more than one generation of trees to acclimate them to our climate, soil, and season. Take the seeds of Duchess and plant them, and if hybridized or crossed by a crab or hybrid, it lowers the standard and reduces the size. If crossed by any of our common apples of the American kind to retain their size, it loses hardiness of tree, which is very essential. As we may yet have Minnesota winters for years and years, the seedling business has been agitated by nurserymen and others, and what have we got to show for the trouble taken to get them? True, we have the Wealthy and a few other seedlings. The Wealthy is a freak of nature, as I understand. Mr. Gideon says it was grown from the seed of a Siberian crab, and yet it is not as hardy as we would like it. There are other individual seedling trees recommended very highly, but we know very little about them, until the young trees come into bearing over the state, and we have had a test winter. Then it will prove the fact that one generation of trees is not sufficient to acclimate them to our climate, no more than to expect a crop of corn the first season from Illinois seed. Then where are we to expect our apples for Minnesota? For the present, any person seeing the amount of fruit on exhibition at our state fairs, can readily see where our apples are to come from. Take away the new Russians and truly the exhibit of seedlings would make but a poor showing at the state fair, but with over 150 varieties of new Russian apples, our exhibit of fruit

compares favorably with that of any other state. But as there are over one thousand varieties of Russian apples in cultivation, with scions collected from different parts of that country, we can not expect them all to be perfect. The fruit of some of them is worthless, others blight badly, while a large per cent. of them are perfectly at home in our soil and climate, and bear beautiful crops of fruit that will compare favorably with any of the Eastern varieties. I think it was a godsend for us when Dr. Regal, in 1868, sent to our experimental ground at Washington, the first importations of scions, and in 1876 scions were distributed throughout our northwestern states for trial. Soon the tree peddlers learned a few of these names and sold hundreds of trees marked as Russians, that perhaps were brought from some Eastern or Southern nursery. They were not Russian trees at all but tagged to suit the name they sold under. To some extent the same thing is practiced at the present. A few days ago in conversation with an agent or tree peddler, representing a nursery in this state, I asked him what varieties of trees he was selling. He answered: "Russians mostly." I also asked him what he was selling for winter varieties. He said he was making a run on the Yellow Transparent for the best winter apple. In this way many farmers are imposed on and frequently get a hybrid or Siberian, or worse some Eastern tree that is sure to winter kill or not bear the kind of fruit that was represented.

Now with the experience of the past and what we have at present, what is our future hope? I believe our present can be bettered. I am glad to see our experimental stations taking hold of this in the right direction by planting seeds of the most hardy Russians, that have been fertilized by other hardy Russians, so as to retain hardiness of tree and size of fruit. I believe there can be a great improvement in such crosses, also acclimating them more to our soil and season. I believe if farmers take hold of this and get trees of the right kind by corresponding with reliable nurserymen for such of the new Russians as they can recommend, they will be satisfied with their investment, and we shall at least be able to supply our home market. Now to have fruit we must plant trees, for we cannot gather grapes from thorns, nor figs from thistles. The first thing to consider is the kind of trees we want, then send to some responsible nurseryman in the state, inquiring if he has such trees; if he has not, then the right belongs to me to send to Iowa or Wisconsin and get them. I do not believe that it detracts anything from the hardiness of trees in one generation, if they are hardy to start with, especially with such a small difference in latitude. My experience has proved that fact with the Duchess, as they are Duchess, whether they are raised in Wisconsin or Minnesota. I believe we ought as much as possible to patronize our own nurserymen.

Now I will give you the names of a few varieties that I can recommend, that have fruited on the farm, or of which I have seen both trees and fruit on Mr. Keel's farm. There may be a great many more varieties that may be better than those I recommend, with so many varieties to select from. For summer: Red Duck, Glass Green, Yellow Transparent, Boravinka and Charlamoff. For fall varieties: Red Anis, Kourk's Anis, White Pigeon, Zuzoff, Enormous and Getman. For winter: Antonovka, Red Queen, Longfield, Cross Apple, Silken Leaf and Ostrekoff. This list might be increased with others of equal merit. Now, how are we to make our trees successful? Not by first exposing the roots to wind and sun for two or three hours after all other work is finished in the spring, and dig-

ging a hole in the grass six or eight inches square, and then thrusting the roots in the hole and tramping some dirt over the roots, and then leaving them to grow; and if they die, which is most likely, curse the nurseryman for selling such trees. We might as well expect to put a pig in the pen and neither give it water or feed, and expect pork from that pig. If we expect to raise apples in Minnesota we must give the trees the care we do other things on the farm. If intending to set out a new orchard, first prepare the ground the same as for corn, then mark it off both ways with the plow, the furrows sixteen feet apart, and at every cross set a tree. I believe in setting them as close together as they will grow, so the limbs will not come in contact with each other when the trees are large. They then are a protection to each other, shading the ground and preventing evaporation from the earth. Now at the crossing of these furrows make a hole with the spade sufficiently large to receive the roots in their natural shape. The depth to set trees depends altogether on the nature of the soil; on light soil I should set them ten or twelve inches deeper than they stood in the nursery row; on clay soil I should not set so deep—on light soil the surface dries out more readily by evaporation than on clay soil. By setting trees deep in light soil the surface may get dry but the roots will still be in damp ground. In setting out trees if the ground is dry, it is better to have water at hand. Set the tree in the hole you have dug, fill in some surface soil and then put in some water, lifting the tree up and down a few times so the mud will get on all the roots; then fill up with dry earth, leaving a declivity around the tree. Mulch with straw or slough hay as soon as possible. In setting trees be sure and put the strongest roots and the most branches to the southwest, also lean the tree the same direction—say, towards the sun at two o'clock—and keep them growing at that angle, and they will not be liable to sun-scald on the southwest side. Also keep them in that position while growing for two or three years and they will remain so. The sun striking the tree in an oblique direction, it has not the heating power to cause scald that it has when the tree stands perpendicular or leans over to the northeast, as is almost always the case. The prevailing winds in the growing season come from the southwest. I tie a cord of wool twine to the top of the tree and drive a stake in the ground at the angle I want, and keep it there.

Now you can plant potatoes, beans, or any hoed crop so as to keep the ground clean, except corn that makes too much shade. and the tree is not so healthy. Cease working them by the tenth of July at the farthest, so as to let the wood ripen for winter. Cultivate shallow for three years, not forgetting to mulch around the trees as soon as the ground freezes. As the trees grow larger apply more mulch. When cultivated three years mulch heavily, as it stimulates the growth of the tree by retaining the moisture in the ground, and keeping the ground from freezing so hard in winter. Let the hogs run in the orchard; they destroy the grubs and worms that injure the trees. Ring the large ones and they will do no harm. With this care, and proper selection of trees, including the Duchess, it will be but a few years until every farmer will have apples for his own use without buying them. For fear that I was overestimating the worth of these new varieties of Russian apples from the experience I have had with them for the last fifteen years, in the early part of this last summer I visited Mr. Tuttle's orchard at Baraboo, Wis. He has over 200 trees of new Russians that have stood the test winters

for 14 or 16 years, or more, and a more vigorous and healthy set of trees it would be hard to find in any of the Eastern states, while the Eastern varieties of trees set in the same rows and at the same time are all dead. I also saw a number of other orchards in the same neighborhood, and of the same class of trees, all healthy and doing well on different locations and different soils.

Again in August I visited the experimental farm at Ames, Iowa, and had a pleasant visit with Professor Budd. His method of doing business is an honor to the state and a blessing to the northwest. Here I saw pears, apricots, plums, peaches and cherry trees. It being after the season for cherries, I did not see the fruit, but he said that it was very fine. He also has a great variety of trees and shrubs, both useful and ornamental, that he brought from Russia, which I believe will be valuable here. After viewing these grounds, we then paid a visit to what he called his old orchard. I do not know the number of trees, but there are several hundred that have stood the test winters of the past 10 or 15 years, and a more healthy and vigorous set of trees it would be hard to find. Then the most profitable as well as the most beautiful part of it was, that the great majority of them were loaded with fruit. This orchard is composed of new Russian trees, but when set, Eastern varieties of trees were set in the same orchard, but they have all disappeared, or nearly so. As for location it is but little over two degrees south of Owatonna; as for soil, if I am a judge, it is far from the best. It is just such soil as Prof. Green's young orchard stands on at St. Anthony Park. So it is not favored by an extra location, but it is because he has the right material in the form of trees to work with. I cannot leave this subject without speaking in praise of our own experimental farm, especially the part I take the most interest in i. e. the horticultural department, superintended by Prof. Green. His experiments with fruit and fruit trees, together with Mr. Dartt's, at Owatonna, will enable farmers to buy trees, and such trees as will live and bear fruit, by their recommendation.

ORCHARDING IN SOUTHERN MINNESOTA.

R. C. KEEL, ROCHESTER, MINN.

Mr. President and Members of the Minnesota Horticultural Society:

LADIES AND GENTLEMEN—I have been requested by our secretary to prepare a paper on orcharding. I do not know as I can say anything on this subject but what has been repeated so often.

In starting an orchard, I should, if possible, select a high and dry northern or northeastern slope, because in the spring of the year, when our orchards are suffering the most, the sun would not have the power to thaw out the ground as early as it would on a level or a southern slope. A sandy soil mixed with clay and a clay subsoil would be preferable. I should prepare the land as well as I would for a corn crop, and dig the holes in the fall of the year, large enough so that all the roots of the

young trees could be laid cut in their natural position and from 12 to 16 inches deep. I think that a great many trees are lost by farmers because of their shallow planting. It is a well-known fact that the deeper we plant a tree the less it will grow the first year or two; but after it once gets started it will, in a few years, be way ahead of those planted shallow. Three-year-old trees, I think, are the best, and in planting them I should slant them about 15 degrees toward the southwest, which will protect the trunk from the hot rays of the sun, and cause the tree to get the heaviest top on the southwest side. I should plant the trees about 15 or 20 feet apart each way, and branch them 12 or 16 inches from the ground; trim them as little as possible—one limb helps to protect another.

While the trees are young, and the bark tender, they should be protected from rabbits and mice, by wrapping them with tarred paper or some kind of cheap cloth; gunnysacking is about the best, and will last for years.

The first few years some hoed crop or small fruit may be grown successfully; care should be taken to keep up the vitality; and they should never be cultivated later than July 15. I should, in plowing and cultivating, work the ground gradually toward the trees, both ways.

In a dry season, after cultivating is over, it is a good plan to mulch with some rotten hay, straw, chip dirt, or any other refuse, and apply it in liberal quantities. Do not put it against the tree, but leave about six inches of bare ground around the tree—let the mulching extend back three or four feet in every direction, and make it thick enough to hold the moisture in the ground. I do not recommend watering except in a very dry season, when it would be well enough to turn a pail full of water on the mulching.

After the trees have commenced bearing, the orchard should be seeded down to clover and used as a hog pasture. If hogs or sheep are not desired in the orchard, the best way is to seed it down with mammoth clover, which keeps the ground loose and mellow. It should be mowed once each summer, put around the trees and used as a mulch.

At the time of planting the orchard plant a wind-break, if it is not already protected by a natural grove. An evergreen windbreak should be secured, if possible, on account of its superiority in winter over any other kind, and its beauty at all times of the year; but where evergreens cannot be afforded or be grown, we have other trees, such as maple, soft and hard, box elder, willow, cottonwood, mulberry and others that will help to beautify the homes, and do good service to the orchard and buildings.

I am anxious and I hope to see the day, when by every farm house in Minnesota there will be a nice row of evergreens planted around a little orchard and fruit garden, thus creating a little paradise where the children will spend hour after hour in peace and joy; and when childhood is past, and the children have wandered away from home, they then can stop and think back to the old Minnesota home, with its little orchard, that grew the best apples they ever tasted, and the strawberries that were better than any other—for no fruit is as good as that which grows in one's own garden.

As to varieties I will name a few, that from my own experience and careful observation are doing well in our part of the state. For summer

we have Yellow Transparent, Tetofsky, Duchess, White Pigeon, Charlamoff, Peach, and others. For fall and early winter, Wealthy, Noble Red Streaked, Autumn Streaked, all of the Anis family, Enormous and Gilbert. For winter, Longfield, Red Queen, Repka, Silken Leaf, Antonovka, Lieby, Malinda, and others. I would not hesitate a moment to put out any amount of any of these varieties, on favorable locations, as far as hardiness of the trees is concerned, but in regard to profit they differ greatly, both in productiveness and quality. Of the summer varieties, the Duchess, Yellow Transparent and Gilbert are among the best and most productive; and of the fall and winter, the Longfield, Wealthy and Malinda are about the best I am growing. The Longfield is my favorite—it bears young and at least one-third more than any other apple tree, and at the same time makes a good growth.

I have a row of this kind top-worked on Orange crab stock 10 years ago, that for the last five or six years have been loaded with fruit to their utmost capacity, and are again loaded with fruit buds for another crop. It is a good market fruit that will always bring a fair price.

The winter of 1884–85, that wrought so much destruction to the orchards all over Minnesota, was without doubt one of the hardest we ever had, or we hope we ever will have, and yet the apples that you see before you in my collection, were all picked from trees that came through those winters and are every year bearing me a paying crop.

We have, according to my opinion, some varieties that have been neglected--for instance the Malinda--and I am glad to see that our Iowa brothers are taking it up and giving it the attention it deserves. I have some Malinda trees in my orchard that are 25 or more years old; they are yet in good condition, and are each year giving me a good crop of winter fruit; last season I picked about fifteen bushels from each tree. The majority of my apple trees are top-worked on some hardy crab stock, and I find that they are healthier and hardier than root-grafted trees. In the spring I shall be prepared to plant out a little orchard for experimenting with the new and old Russians and some seedlings. They will all be top-worked on some of the hardiest crab apple stock such as Virginia, Whitney, and Transcendent; a couple of trees of a kind. I have now about 160 varieties of scions for that purpose, and would like to have some more if I knew where to get them.

In conclusion I will say, that I see no reason why every farmer in Minnesota should not have an orchard that would furnish his family with a supply of apples, at least six months of the year, with the varieties we now have at our command; and with the good work our experimental stations are doing, we can, and ought to raise our own apples, better in fact, than those we now get from eastern and southern states.

DISCUSSION.

Mr. Dartt: I would like to ask Mr. Keel if we understood him right when he said that he recommended the use of tarred paper wrapped around the trunks of his trees?

Mr. Keel: Yes, we use it a good deal down there, but we use cloth more than anything else. We use a kind of a gunny-sacking.

Mr. Dartt: I asked the gentleman the question if he recommended tarred paper to bind around apple trees, because my own experience has taught me that it is injurious. At least, I have lost quite a number of valuable apple trees by binding them with tarred paper, and my explanation is that the dark color together with a tarry or oily property in the paper worked together in certain hot days in winter to attract the heat and thus injured the tree. I therefore abandoned that practice long ago and now make use of building paper, or any kind of paper that is white, that I can bind around the tree, and which will afford sufficient protection against mice and rabbits.

Mr. Keel: I will say that I have used both the tarred paper and the cloth, and I don't see any difference; nor have I learned the tree is injured in any way. But on the most of my trees I use gunnysacking. It is the cheapest, and it will last for a good many years if it is taken care of.

Vice-President Wedge: I think that the idea of wrapping with gunnysacking is very valuable. Mr. Patten, of Charles City, Iowa, has very strongly recommended it. My opinion is that it ought to prevent sun-scald.

Mr. Ludlow: I would say for the benefit of those farmers whose trees are injured by rabbits that I have a simple, certain remedy. Set common rat traps in the orchard in their runs, and go to them at dusk. Do not leave them until morning, for if you do the leg will freeze, and a very slight movement will break it and let the rabbit escape. But, if you watch your traps at dusk, you will very soon clear your orchard. I have tried it and find the plan a perfect success, having killed all the rabbits in my orchard in that way.

Mr. Harris: I rise on the question of tarred paper. I have traveled over the country considerably and seen some of the trees that were claimed to have been injured. Down in southwestern Iowa I saw two instances of the danger of using this black tarred paper. If it touches the trunk of the tree and is left on it long enough, you are bound to have a dead side on the tree. I also found a man who, after an experience of that kind, used common white cotton cloth long enough to tie around at the ground and wind up to the forks of the tree. He claimed that if you take them in the spring and lay them away, they will probably last as long as any man will want to use them. So much for their durability. He also claimed that it is a perfect protection against sun-scald, and said he did not have a sun-scalded tree in the orchard.

REPORT OF COMMITTEE ON RUSSIAN APPLES.

J. H. HARRIS, LA CRESCENT.

Mr. President and Members of the Minnesota State Horticultural Society:

As far as my experience, observation and inquiry have extended, no injury whatever occurred last winter to any of the Russian varieties of apple trees that are being grown in this and the adjoining states of Wisconsin and Iowa. The same is true also of all American varieties that are considered reasonably hardy, and the trees of both have generally made a vigorous and healthy growth this last season, and entered the winter apparently in good condition. The only advantage that I can discover, favoring the Russian over the native, is that the warm weather of the autumn did not cause the buds to start very materially, while on some native varieties they enlarged considerably. Upon my place they have been fully as free from blight as any others. In the parts where the older orchards are located the crop of fruit was generally light, often nearly a total failure, so the opportunity for making observations on the quality and value of the fruit has been limited. A considerable number of varieties were shown at the last Minnesota state fair, by Andrew Peterson, Wm. Somerville, R. C. Keel, and others, that were as fine in appearance and good in quality, on an average, as an equal number of the American varieties that can be grown here. The short time that these varieties have been under careful systematic experiment, in a few places, makes our knowledge of them so limited, together with their mixed-up and uncertain nomenclature, that we will not be justified, as a society, in recommending more than a few varieties for general trial, and those only in limited quantities. But we should not discourage the people who have the time and facilities for doing so, from aiding our experiment stations in prosecuting the tests with the greatest possible dispatch, so that their merits or demerits may be most quickly learned.

With our present knowledge of them we have no right to set up any particular variety and say that it is hardy under all conditions and adapted to growing in all parts of our state. The country where they originated has at least as great a diversity of soil and climatic conditions as will be found between a line running east and west through southern Iowa, and another through Manitoba. Many of the varieties are entirely local, being confined in Russia to very narrow limits, so that we can hardly expect that all or any considerable number of them will thrive in every section of the country. There will doubtless be found some exceptions that will come as near doing so as has the Oldenburg. In the list proposed for general trial I would suggest the Hibernal, Lieby, Ostrekoff Glass, Cross, Charlamoff, Christmas, Borovinka and perhaps the Antonovka, Zoletoreff and the Arabian of Mr. Tuttle's collection. The Hibernal and Lieby are probably the hardiest in tree, and the fruit is of great value for the kitchen. If carefuly handled they will generally keep until midwinter. The Borovinka, in size, form and general appearance resembles the Oldenburg, but is less acid and will keep a month later. The tree can scarcely be distinguished from the Oldenburg, but is a

little stronger grower wherever I have seen it. The Ostrekoff and Antonovka are with me vigorous growers, producing fruit of excellent quality that keeps well into winter, but thus far they have not fruited as heavily as I could wish. In the second list I will not at this time name varieties, but would suggest such as are promising the best on the grounds of the state experiment station at St. Anthony Park. In the exhibits at the fairs we find them shown under the names by which the growers received the trees (or possibly by names attached to cover all the varieties on which premiums are offered), and many times as only Russians, and consequently half the value of the exhibit is lost. As soon as possible the names of varieties should be corrected and each variety, before being eligible to a recommendation by this society or to exhibition for special premiums, should be catalogued and correctly described. From the fact that numbers of the trees make a slow and feeble growth in the nursery, I am inclined to the opinion that the stocks generally used in their propagation are not congenial, and that we may get better results by growing the stocks from the seeds of Russian varieties produced in our own state.

DISCUSSION.

Mr. Brand: At the beginning of that report he says that he saw that no evidence anywhere of any injury to Russian apples. I wrote an article some time last spring for the "*Farm, Stock and Home*," in which I said I would be glad to show people the difference in hardiness between Russians and other varieties, where there were thousands of them to be compared. The block that I had reference to was a block of yearling trees. I had mulched along the rows for perhaps ten rods, and as far as the mulching went the Russians, and the Lieby especially, showed no injury whatever; but, just as quick as the mulching stopped, any body could tell by the appearance of the trees where it stopped. There was a great deal of injury done where the trees were not mulched. This was also true of a number of other varieties that I received from Mr. Somerville, which were supposed to be his best varieties. They were all root-killed. There were other varieties near them that were not injured. A year ago last summer, when I was at Mr. Peterson's place, he said he should never plant another Russian apple tree, on account of the injury done to them by the blight; but "time heals all wounds," and people are liable to forget the unpleasant things they have passed through, so I presume we shall go on planting Russian apple trees. However, we shall not be able to judge of them thoroughly until we get another winter like that of 1884.

Mr. Harris: Mr. Chairman, I have contended all along that we don't know anything about Russian apples. We don't know

anything about Russia, only by hearsay. We know that it is a cold country and extends a good ways north of this—that it is a very large country. We know that in some portions of Russia they are able to raise peaches and apricots, and the finest kind of sweet cherries. In other portions they can only raise the very hardiest of apples and pears, and that in a latitude so far north that trees twenty-five and even fifty years old are only shrubs. Now, it seems to me that if we can get varieties from that country and try them under the same conditions as those under which they originated, if we can get samples from those districts similar to our own and give them a trial, we can at least plant the seed and go on with a good prospect of getting something that will flourish here. We never ought to have recommended any Russian apples for general cultivation. We have recommended a good many other apples since this society was organized twenty-five years ago, that we ought not to have recommended, and it has frequently set us back. Fortunately we are not now obliged to throw out feelers all over the country, and try and induce farmers to experiment, as we were in the beginning. This is largely due to the influence of this society in the agricultural experiment stations. We had to bring a great deal of effort to bear to enable us to reach the position we now occupy. But, while we have done a great work there is much yet to be done; and I am in favor of not only having state stations, but also sub-stations in every county. It may cripple one class of nurserymen, but it wont hurt the nurseryman who carries on an honest business.

RUSSIAN APPLES.

A TALK BY J. B. MITCHELL, CRESCO, IOWA.

I do not know, gentlemen, that I am able to tell you very much about the Russian apple. I hardly know what you want to know about it. It is true that I have had experience with them for some time. As early as 1872 I obtained my first scions from the Department, and right here let me say that I have never tried any of the later importations, that is, those that are being tried at the College Farm, and I have something like about 100 varieties. Until '84 and '85 I didn't have so much favor for them as I have had since. At that time I was growing other varieties that were apparently doing very well, but those winters tested them very severely, and many of them were in-

jured. I noticed that all this time the Russians, as a general thing, appeared to be getting more hardy. The winter of '84-5 left me with nothing but the crab apple, the Duchess of Oldenburg and my Russian apples. I am south of you and perhaps I am in a less trying position, but from reports that I have seen of the varieties that you have grown in Minnesota, farther north than I am, I have sometimes thought that perhaps I was in an extraordinarily trying locality. Yes, I think I am. The Early Richmond cherry was grown just over the line in this state, while I could do nothing with it. The Russian apple did well when even the crab apple failed, and that led me to go into the subject to some extent, and from that on I have been an earnest advocate of the Russian apple. Now, I notice that you recommend the Wealthy. Well, until 1884 the Wealthy did well with us, and I considered it as hardy as the Duchess, but after that winter there was not a tree remaining on my ground, or for that matter, in the county. But for all that, I am again propagating them. We find that there are different degrees of hardiness in the Russians as in the American apples, but there are some 15 or 20 varieties, that I have tried, that I class as hardy as the Duchess, or more so, and the one that I consider the most hardy of all is No. 240. I have always called it the Lieby, and it was so reported in the government catalogue.

Vice-President Wedge: I would like to ask you about the color of that apple.

Mr. Mitchell: Well, it is variously colored. You can get almost any color from red to russet. They are not highly colored, but are perhaps half striped with a dull red, and around the stem it is always golden, even when the apple is highly colored.

Vice-President Wedge: Mr. Charles Patten tells me that he thinks that you have the true Hibernal instead of the Lieby.

Mr. Mitchell: I think that I have them both. I obtained them both and I don't think there is any difference between them—practically no difference. In the tree they are apparently one and the same thing, and in the quality and appearance of the fruit they are identical. I have always exhibited the fruit at the fairs in the state and, while some of the most knowing men will pick them out as the Hibernal and Lieby, they are just as apt to get them twisted around as not. As for myself I think there is no difference. Mr. Patten claims that

there is, but I think he is wrong in that as well as in some other things.

Vice-President Wedge: My Hibernal is quite different from the Lieby that Mr. Patten has. The apples are not very highly colored, with the exception of a few specimens that have hung in the sun. Now Mr. Patten's Lieby, as I have seen it, bears fruit nearly as bright as the Duchess.

Mr. Brand: You may find green and colored apples on the same tree, but they all have a golden russet color on the stem.

Prof. Green: Is there any noticeable difference in the length of time that they will keep?

Mr. Mitchell: I cannot see that there is any difference. I will say further that I have seen them as grown by other parties—by Prof. Budd, Mr. Charles Patten and a number of others—they have had them at our state fairs and winter meetings, and they are apparently just like mine. I think the time will come when it will be admitted by all, when the fruit becomes a little more plenty, that the two are identical.

Vice-President Wedge: One further question. Were your Liebys bearing heavily before that severe winter of '84-5?

Mr. Mitchell: Yes, sir. I had trees that were bearing before '84 and '85. I have noticed that a tree will suffer more the first winter after it has been transplanted than it will at any other time.

Mr. Harris: That is correct.

Mr. Mitchell: In the spring of 1884, in my last orchard of original trees, I took from my first grafting some four or five-year-old trees and transplanted them into the orchard in rows, and they came through that winter of '84 and '85, while the Duchess was killed back some inches.

Mr. Harris: How about the blight?

Mr. Mitchell: They are as free from the blight as the Duchess.

Prof. Green: Does the Lieby blight at all?

Mr. Mitchell: Well, I am under the impression it does.

Prof. Green: Mr. Peterson says that the Lieby blights a little on the new wood.

Mr. Mitchell: Well, I am quite sure that I have seen some blight on it.

Prof. Green: How about the Charlamoff—how does it compare with the Wealthy for hardiness?

Mr. Mitchell: Well, I should say there was not much difference.

Vice-President Wedge: We are very glad indeed to have Mr. Mitchell with us, and I am sure we are all very grateful to him for his interesting and instructive talk.

Mr. Smith: I am running about over the country nearly all of the time. Last October I noticed Mr. Mitchell's trees, and I may say that I was very happily disappointed in them when I came to see them. I believe they were the finest looking lot of trees that I have ever seen in the northwest. I had always been a little skeptical so far as the Hibernal is concerned, until I visited his grounds and saw his trees, but I now consider him justified, after examining the trees, in recommending them as he has. Some of the trees were sixteen years old, and more than that, it would seem almost incredible to some of you if you were told what an unfavorable location they were placed in, on the side of a hill sloping to the southwest. So I have concluded that Mr. Mitchell was justified in so highly recommending those trees. It would pay any of you who are interested in this matter, if you can do so, to visit his grounds and see those trees, for they are well worth looking at.

Mr. Underwood: Was the orchard cultivated or not?

Mr. Mitchell: Part of the orchard has been in a horse pasture since 1884. That winter killed out the trees there in that nursery, and I discarded it for that purpose and let it run into a horse pasture. Part of the trees are in there and the others are now standing among the six year-old trees. Some of them stand on sandy loam and some on limestone sub-soil, and the trees in the north end stand on a light colored sandy soil with a quicksand under it.

QUESTION BOX.

1. Is a tree on its own roots hardier than when grafted?

Mr. Brand: There are numerous instances where grafted varieties have done better than the original seedlings from which they were grafted. I refer, in proof of this, to the Wealthy and the Minnesota. The original tree of the Minnesota never produced more than one bushel and a half in any one year, while there are numerous instances of grafted Minnesotas producing as high as three or four bushels in a year. The original tree of the Wealthy, developed under the most favorable conditions during a period when we were raising Flemish Beauty pears, and more than one hundred varieties of grafted apples, never produced as much fruit as grafted trees of the Wealthy, developed under less favorable conditions.

Mr. Harris: The fact that the Wealthy and Duchess are more productive as grafted trees, does not conclusively prove the superiority of a grafted tree over the other.

Mr. Dartt. It is well known by men who have had long experience that the fact that an original tree does well and bears big crops, is not conclusive evidence that its progeny will be successful.

Mr. Brand: I claimed in my article, which I read before this society last winter, that the original trees developed under favorable conditions did not conclusively prove their superiority over grafted trees. There was a long term of years during which the conditions were favorable, and those trees were able to reach an age at which they could take care of themselves. They attained a growth which enabled them to resist a great deal more than younger trees that were growing in the nurseries, and had not attained the proper age to resist extremes of heat and cold, and other adverse elements.

Mr. Dartt: I would like to hear from Prof. Green on this subject.

Prof. Green: There can be no question but there is a tendency for exhausted vitality to reproduce itself. There is hardly a question about that, and for that reason, if the roots of a tree that is tardy in bearing be trimmed a little or injured in some way, it will run to fruit. Apple trees have often been girdled to make them fruitful. I have noticed that the Wealthy apple grafted on the Virginia crab stock is greatly improved in longevity. It makes the finest union that I know of. The Wealthy tree is especially weak in its trunk, and the Virginia crab is strong in this point. Thus the tree is made to live a longer life. I do not know whether a tree is longer-lived on its own roots or when it is grafted, but I would prefer a tree on its own roots. Mr. Charles Downing has said that seedling trees have proved very deceptive as to their real value, when tried in the orchard.

Mr. Harris: You can put a tender variety on a hardy stock and thus prolong it.

Mr. Brand: The trees I refer to were all root-grafted trees, and they have done better than the original trees.

Mr. Mitchell: I would like to make a suggestion, to offer a theory of my own, that the best and quickest way for the people of Minnesota and northern Iowa to get apples would be to have the farmers plant seed, and when the trees are one or two years old, transplant them into rows in an orchard. Then cultivate them for a few years, and they will do better on their

own roots, and come into bearing sooner, and produce better crops of fruit, than if they were grafted.

2. Which is the most promising Russian cherry to experiment with on the western border of the state in latitude 45?

Mr. Cook: I cannot recommend any, even for trial. Some of them have proven quite hardy, but they make a slow growth, being now only two feet high. I know of none that I can recommend for trial.

3. What is the best Russian pear for planting in 45 degrees north latitude?

Vice-President Wedge: The best pear I have is the 392 Kruskaye.

Mr. Cook: I have a few varieties at my place. I have four or five varieties I think are as hardy as the 392; among them are the Tonkevitcha, Victoria, Gascova and the Lemon.

4. Are two year old seedling mulberries worth trying to propagate for the fruit, and if so, how would you transplant and cultivate?

Mr. Ludlow: It is a question in my mind whether any kind of mulberry is worth propagating for the fruit. My experience has made me a little doubtful. My first fruit was about the size of dried peas, but gradually they have grown larger, until last year I had some trees that had some fruit half an inch long on them. They bore so heavily that when it dropped off the fruit was at least half an inch deep all over the ground, and I had to turn the hogs in to clean it off. The mulberry is more valuable to feed birds than anything else.

Mr. Cutts: What time of year did they ripen?

Mr. Ludlow: About the same time as currants.

Mr. Cutts: Then they would not help the grapes any?

Mr. Ludlow: No, but they help the cherries and fruits of that kind. I think they are more valuable as a hedge plant than anything else. I thought I had lost money enough on them when I had spent $25 to get mine started, but I have a hedge alongside my lot that I would not take $100 for now. They grow very rapidly.

5. Is the European *Prunis patis* a better fruit than our choke-cherry?

Prof. Green: I think not, if you mean by the choke-cherry he black choke cherry

GRAPES.

GRAPE GROWING IN MINNESOTA.

DR. M. M. FRISSELLE, EXCELSIOR.

The high latitude of this state has given rise to the impression that the vine cannot be successfully grown here. Because more southern and warmer regions have seemed to be the natural home of the grape, and because the culture of many varieties has been found profitable in such sections, the inference is natural that high latitudes are uncongenial to this fruit, and that here it is unwise to undertake its culture as a means of profit.

That this impression is erroneous, and that the inference is not justified by the facts, can easily be demonstrated.

The vine (vitis), like many other members of our flora is indigenous to a wide range of latitude. It is found growing wild in the extreme southern states, and as far north at least as our Canadian border.

This certainly is a hint that grape growing may be successfully prosecuted throughout most of this wide range, and even the comparatively limited production of grapes in Minnesota is evidence that its more extended culture is possible. What has already been done in this direction is certainly sure ground upon which to stand in indicating what can and should be done in the near future.

So far the greater portion of the grapes grown in the state have been produced in the immediate vicinity of Lake Minnetonka. For more than twenty years this section has been noted for producing some of the choicest varieties in great perfection, especially the Delaware, which has invariably commanded better prices in the market than any other grown east of the Rocky Mountains.

The season of '91 was unusually favorable for the culture of this fruit. No late frosts of spring nipped it in the bud, or early autumnal cold hindered its ripening. The season of blossoming was favorable for the setting of a large crop, and the alternating periods of aridity and humidity were such as to be unfavorable to the growth of the downy mildew and kindred fungi, but were especially conducive to the development and perfection of the fruit. The month of September was unusually dry and warm without hurtful frosts, thereby securing complete ripening of even the late varieties.

During the month of August I visited many of the vineyards about Lake Minnetonka, making note of their particular location, manner of planting and methods of pruning, treatment of sod, etc. Most of the vineyards gave evidence of being well cared for, being clean, well trimmed and generally in good condition, and all giving abundant promise of a remunerative harvest, which the subsequent vintage more than fulfilled. It gives me great pleasure to make mention of the special features of some of the vineyards visited, as they were models worthy of com-

mendation and imitation. Among the vineyards visited was that of Mr. Modlin, which is located southeast of the main body of Lake Minnetonka, and has been in bearing at least a dozen years. The chief varieties grown are Delaware, Concord and Iona, though the Delawares are the most numerous. This vineyard has the best of treatment, being most carefully and intelligently trimmed, and the entire ground kept free from any encumbrance. The vines were well laden, but not as heavily as some others visited. The vineyards of B. F. Beardsley, Mr. Crane and Mr. Stoddard, are in the same neighborhood. That of Mr. Beardsley is located in a warm nook, surrounded mostly by woods which protect it from winds, thereby favoring a more humid atmosphere and the greater tendency to fungous growths. This vineyard of about 800 vines is in full bearing, and mostly of Delawares, and I noticed that much of the fruit had been bagged. This vineyard does not ripen its fruit quite as early as some that are located on higher and more airy ground. The vineyard of Mr. Crane has not long been in bearing, and I noticed that many of the vines were Moore's Early, and were heavily loaded. The finest clusters of this variety, that I have ever seen, were in this vineyard.

The vineyard of A. W. Latham, which I believe to be the oldest in the neighborhood, is located on a steep southern slope and is composed largely of Concord and Delaware, though a small corner is devoted to testing a number of varieties. This vineyard was in its usual excellent condition and well laden with fruit. The vineyard of C. W. Sampson, though not large, is favorably located on the south side of the upper lake. It ripens its fruit early and was in tolerably good general condition. The vineyard of G. W. Jones, located near the latter, consists of 1,200 vines in bearing, divided about equally between Concord, Moore's Early and Delaware, with a few Ionas. This vineyard is leased and consequently does not receive the best of care. The vineyard of Prof. H. W. Malcolm, adjoining the latter, consists of about 800 Delaware vines that were in the most superb order. So far as care and general treatment are concerned, this vineyard was in the best condition of all visited. It was truly beautiful and worth visiting as a model. The vineyard of A. D. Leach, located some distance south of Lake Minnetonka and near Lake Minnewashta, has for years been noted as one of the best cared for and most productive of all in the region of the lake. It is located on high ground on a southeast slope to which the sun and wind have free access. The varieties grown are mostly Delaware and Concord, the latter being preferred. I have never seen a more abundant and beautiful exhibition of grapes on the vine than this vineyard of about 500 vines afforded. The summer pruning had been thoroughly and judiciously done, and the show of fruit was superlatively fine.

On the north side of Lake Minnetonka there are quite a number of flourishing vineyards, among which is one of 3,000 vines owned by G. Bone, which is well cared for and productive, and another of 800 vines, mostly Concord, owned by August Brusch Weilder, and one of 1,000 Concords owned by George Stafford. Mr. Ethan Stubbs, of this section, is the possessor of a fine vineyard of 3,500 Delaware vines, whose fine fruit has an excellent reputation in our best markets. There are many other vineyards of considerable size in good condition, that I only know by the excellent reputation they bear. Those of Louis Reel, G. Morris and Mrs.

Erwin, situated near Christmas Lake are among the best. With regard to my own vineyard of 1,400 vines, 1,200 of which are in bearing, I will only say that it has been five years in fruit, and this has been its most productive season, yielding 1,350 pounds. As far as I have been able to estimate, there are in the immediate neighborhood of the lake about 35,000 vines in bearing, yielding the past season not less than 250,000 pounds, or 125 tons of grapes, which at the low price of 4 cents a pound were worth $10,000, making an important item of income to the fruit growers of this immediate region.

Besides these there are many thrifty and productive vineyards in the towns along the river, largely owned by Germans. These vineyards are mostly devoted to Concord, Moore's Early and Janesville, on account of their early ripening qualities, though the Brighton, a much better grape in all respects, is fast coming into favor. The crop of grapes in these towns along the Mississippi River was this season very large and of excellent quality, finding a ready market in the convenient cities and villages. At a local fair of considerable magnitude in St. Peter, I noticed an exhibit of about four quarts of grapes of very indifferent appearance, but I could not give them a fair examination, as they were located in the center of a wide table and very carefully protected from either view or handling by a substantial covering of netting. The fact that grapes had been grown and were here on exhibition was at least an encouraging sign.

There can be no doubt but there are many other localities of which I am not informed where grapes are cultivated, and there does not appear to be any insurmountable obstacles in the way of extending this industry throughout a large portion of the state. Most of our farmers largely confine themselves to the growing of cereals, grasses and root crops. Very many, perhaps nearly all, are under the impression that it is of no use for them to try to raise grapes. The reason for this conclusion is that they do not know how. They do not know the requirements of soil, exposure, etc., nor do they know the varieties best adapted to this latitude.

The region about Lake Minnetonka has become famous for its vineyards simply because a few persons not many years ago tried the experiment of raising grapes, and found that the Delaware and some other varieties could be produced here in perfection. There are only two or three conditions required to make this or any other section favorable for the culture of the vine, and no doubt these same conditions abound in most other portions of our state. These are a rich soil well supplied with humus, with a clay subsoil, and having a gentle slope to the south or east, with the genial influence of a considerable body of water near by. The protection of a forest on the north side of a vineyard is desirable, but the influence of a large body of water in the same relation is better, as it retains a considerable amount of heat during the early autumn, which greatly modifies the frosty northern winds. As our state is noted for its numerous lakes of all sizes, it is but reasonable to suppose that there are many locations that would prove equally favorable to grape culture as those on the shores of Lake Minnetonka. In view of all the facts tributary to this subject, there appears to be no valid reason why Minnesota farmers, and especially all fruit growers, should not give some earnest attention to the cultivating of this desirable, delicious fruit. To this end it seems important that the superintendent of our farmers' institutes should emphasize this important department of his valuable work, and

thus provoke some right thinking on this matter, which would naturally be followed by corresponding action. This society, that has already done so much to encourage horticultural work, would and should do much more by offering premiums on growing crops, as is so generally done by the more enterprising and advanced societies at the East. Our present practice of giving the largest premiums offered to persons exhibiting the largest number of varieties of grapes, for instance, only stimulates persons to plant a vine or two of a large number of kinds without regard to their value, simply for the premium; and besides our society allows premium hunters to scour the country for fine specimens, which added to those grown by themselves, enable them to carry off the large premiums offered. Such practice may have been proper and perhaps was best in the infancy of fruit growing here, but in the present advanced state of this industry can hardly be commended.

If our society would offer a liberal premium on the best quarter or half acre of strawberries, raspberries or blackberries, or on the best 500 dred or 1000 currant bushes or gooseberries, or on the best vineyard of 500 or 1,000 bearing vines of two or three of the best kinds of grapes, &c., it seems to me that the real cause of horticulture in our state would be materially advanced. Of what value is it to the community that a person exhibits twenty kinds of grapes, when not a half dozen of them can be safely recommended for general cultivation. It is not difficult to secure by extraordinary care and culture a few quarts of strawberries, raspberries, currants or any other fruit from a few highly fertilized plants, for exhibition. But how does such an exhibition help those who may desire to grow these fruits for family use or for market, compared with a half acre or more of these vines in actual bearing, showing the method of planting, trimming, general care, etc.? Of how much more practical value to the practical fruit-grower is a visit to the experimental gardens at St. Anthony Park, with explanations and suggestions from Prof. Green, or a visit to the grounds of any successful fruit-grower where he can see and hear by what steps the success has been achieved, than a few quarts of fruit on the exhibition tables? I would by no means wish to be understood as advocating the abolishing of premiums on fruit exhibited at our fairs, but I would humbly suggest that our premium list be so modified as to offer less on number of varieties and add to the list a few liberal premiums on *growing crops*.

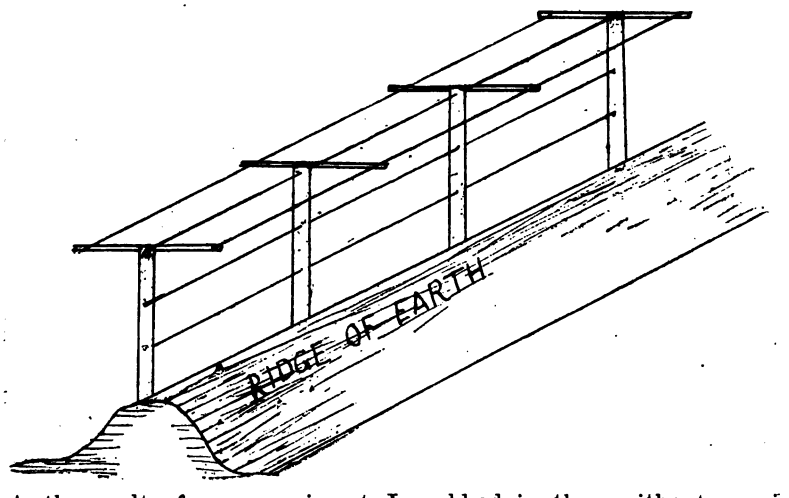
AN AMATEURS SUCCESS WITH GRAPES.

SAM'L DOUGHTY, LAKE CITY.

In 1865 I first began the cultivation of grapes, planting and pruning in the conventional manner laid down in the books of the period. Close observation, however, soon convinced me that the best fruit was invariably found nearest the *ends* of the canes. I soon abandoned the usual practice of pruning to the third bud, and began to increase the length of the bearing wood till the canes were from six to ten feet long, depending upon the vigor of the roots and the mature condition of the cane. I also found, that if I would have fruit each year with a reasonable degree of certainty, I

must provide some kind of a winter protection for the vines. To cover them with earth was a slow and laborious process, and the wind frequently disturbed a straw covering. To obviate that and with a view to convenience, I began to move the soil up to my vines, making ridges where the plants grew and corresponding depressions between the rows. I found this a great improvement, and I also discovered that where the sun's rays struck the ridges most directly, there the vines threw out many new fibrous roots, and both vine and fruit were benefitted. As the canes became old and stiff, I found it difficult to bend them down without injury, so I began to encourage the growth of young canes, and when these came into bearing, I cut away the older ones, replacing them with young, pliable vines that could be readily bent without injury. I soon had my vines growing on high ridges with only young fruit-bearing canes

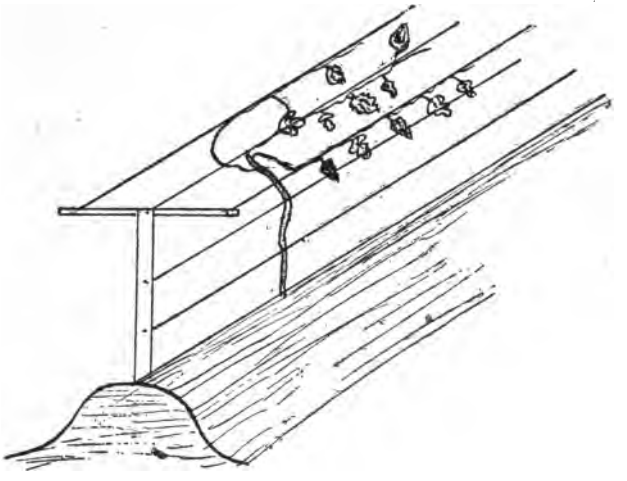
I was not long learning also, that I could control the lower part, or body of the canes, so that it was not necessary to replace the old ones so often. My plan is this: I take a young cane, train it up to the trellis, and *keep all* leaves removed from the stalk, up to the height where I desire it to branch. I then permit the cane to put on as many branches as I desire, keeping all foliage pinched off below the branches. By this means, the main stem or body of the vine remains small and pliable, and can be readily bent down for covering.



As the result of my experiments I would advise those without experience as follows:

Use strong two-year-old vines, and plant in rows running north and south, about twelve feet apart. The vines should be set on ridges eighteen to twenty inches high, and about ten feet apart on the ridge. For a trellis, I use posts about five feet out of the ground with a piece of 2x4 scantling about four feet long nailed to the top at right angles with the row, boring two holes through the posts, one about two feet from the ground and another eighteen inches above that, and three holes in the cross piece, one at each end and one in the center. Now, run your wires through these holes, coupling them together between the posts, so they can easily be uncoupled and drawn out, allowing the vines to fall to the ground.

The vines can then be pruned and arranged in the trenches between the rows, where they can readily be covered with stalks or straw for winter. The snow collects on the straw, and thus they winter perfectly.



In pruning, never allow any old or stubborn wood to remain, but manage to have a young sprout ready to take the place of any old cane that may need to be removed. Always retain enough fruit-bearing wood to fully cover the trellis. Don't be afraid of too much wood, but make the root carry all the young, thrifty wood it can nourish properly. My pruning consists principally in removing old vines, and cutting back and thinning out the terminal limbs. I do no summer pruning as I find the excess of fruit-bearing wood requires all the foliage I can grow. My cultivation consists entirely in mulching the ground heavily with rotted manure, and removing all weeds and grass. The above plan will enable the amateur to secure most excellent results with a small investment and a minimum of labor.

I have known the early frosts to catch fully one-third the crop, after the grapes were set, but in the system above explained, the vines were brought up to the sun and moisture, the fibrous roots lay near the surface of the ridge and received the full warmth of the sun, and as a result, a second crop of bloom was developed in ample time to ripen, which I attribute it to the high, shallow system of surface cultivation. I cannot lay too much stress upon the manner of growing the wood. When the young cane is long enough, tie it up to the first and second wires in succession, then pinch off the leaves, beginning next the ground, and follow up until your vine is long enough to reach the upper wires; there you may permit it to branch, after which I do not allow a single leaf or bud to appear below the branches. This keeps the canes small and pliable, and also permits a free circulation of air and sunlight beneath the trellis, and will be attended with the very best results, if fruit is your desire. I have a trellis twenty feet long, seven feet high, and eight feet wide, covered with the canes from one root, which has borne over 300 pounds of fruit in one season. This is of the Concord variety, but equally good results may be obtained from any other equally good growing variety.

On the southeast side of my walk I planted one vine about 1871, and first tied it to a pole, but as it spread and increased in size and number of canes, the idea occurred to me to convert it into an arbor. I built a trellis about eight feet wide, twenty feet long, and seven feet high, then laid down several canes, covering them slightly with earth, and as the sprouts appeared, I trained up such as I desired to use, at proper intervals, cutting off those between. In this way, I have succeeded in securing a most grateful shade, so thickly covered with foliage, that no inconvenience is ever experienced from the brightest sunshine. The top of my trellis is constructed of cross strips at intervals of six and one-half feet, and these again intersected by strips running lengthwise about one foot apart. When the vine is in full fruitage, the clusters hang below the trellis where they are fully exposed to the light and air, and except in case of extremely early frosts, seldom fail to ripen. I am convinced, also, that having the protection of the foliage above the fruit, affords considerable protection from frost. It also facilitates gathering, and enables the picker, also, to select the ripest fruit, leaving the bunches on the vines that are not matured to ripen fully. The vine has produced over 300 pounds of grapes in one season.

GRAPES.

DANIEL BUCK, MANKATO.

I write this article at the request of your secretary; it is not prepared for the professional grape grower, but for the farmer, laborer, or business man who has not a great deal of time to spare, but who can raise plenty of grapes for his own household, if he will give the subject a little time and attention. A man need not understand Latin and Greek, nor spend months in studying the technical terms and phrases used by some of the writers on grape growing, in order to have a good supply of this healthy and enjoyable luxury. I have been engaged in raising grapes for twenty-five years, without any instructor to teach me, and following a few simple rules have raised each year heavy crops of grapes. I have over thirty varieties, but never sold a grape or vine, and have none for sale. My garden is on the second bench seventy-five feet above the Minnesota River, facing northwest, with soil very rich and formerly covered with a heavy growth of timber. Grapes do well along our valleys and river bluffs, and especially around our lakes and in the timbered lands. I am not prepared to say just how well they will do on our prairie soil, but do not see why they should not succeed there, if the soil is well drained and thoroughly cultivated. Standing water in a clayey soil is death to the grape vine, for grape vines are like people, they suffer from wet feet.

PLANTING.

The ground should be thoroughly plowed or spaded, and worked deeply as it can be conveniently. Dig holes twelve or fifteen inches deep and have the holes large enough so that the roots can be spread out nicely without cramping. Fill in three or four inches with fine earth, upon which place the roots, and then fill in with very fine earth among the roots, and press this earth down so that it will be firm. The roots should

be thoroughly wet before they are placed in the hole. People generally do not plant vines, fruit trees, or shade trees deep enough in this state, and the result is failure. In the Eastern states the clay comes nearer the surface than in Minnesota, and the manner of planting there is not a safe guide for us. When the hole is nearly full of dirt pour in a pailful of water, and then put on two or three inches of fine soil so that it will not bake or harden. Do not plant when the soil is very sticky, and do not dig the holes any faster than you plant, and keep the roots of your plants wet with a carpet or other covering over them, so that they will not get dry before setting. Be careful and not place any manure next to the roots or in the holes. If you do there is danger of the roots drying up, or fungi may attack them. Old and well rotted manure is beneficial to enrich the soil, but should not come in contact with the roots when first set out, and fresh manure should not come in contact with the roots or vines at any time. The vines can be set seven feet apart in the row and the rows eight feet apart. They do well in garden culture for many years set much nearer than this. The vines should be two years old or a very strong one year old.

CUTTINGS.

Vines can be bought so cheaply now, that those who desire early results should not wait for cuttings to bear. Of course, if one is growing vines for sale, or to enlarge his own vineyard from choice varieties which he already has, then the planting of cuttings may be desirable. Cuttings may be taken from the vine at any time after the frost has killed the leaves, and generally at almost any time during the month of October in this state. The short-jointed kind should be cut with three buds, and the long-jointed with two buds. They should be cut close below the lower eye, at right angles with the slope of the lower bud, as the roots form more readily just under an eye. The upper cut can be made an inch or two above the upper bud at right angles with it, and slanting upwards so that the upper point is on the same side as the bud. Of course roots will start from each eye placed under ground, but if there are several buds so placed, the roots will be more scattering and generally not so strong as those where only one bud is under ground. The cuttings should be buried in the ground ten or fifteen inches deep in a dry place. As soon as the ground is fit to work in the spring, take a spade and open a space as deep as the cutting is long, leaving the side against which the cutting is to be set slanting at an angle of 45 degrees, so that the upper bud comes even with the top of the ground; or if there is danger from cut worms, leave the upper bud sufficiently above the surface of the ground so that the worm cannot reach it. Set the cuttings two to six inches apart along the slanting side of the excavation and fill in with soil half way to the top of the ground, and then with your foot stamp the earth against it as compactly as you can, and then fill up and stamp again against the cuttings as they stand on an angle. Cuttings do much better if placed in a partially shaded place, as on the north side of a fence or where the soil is rather moist, or if protected from the heat of the sun by putting a board on the south side of them slanting a little over the cuttings. In dry weather they should be thoroughly watered two or three times a week.

I have never been able to make a cutting grow which was set in the fall in the ordinary manner, and I advise against the experiment being

made in this climate. The cuttings from some varieties grow more readily than from others. Eldorado and Roger's Hybrids are grown very easily from cuttings, while I have never been successful with cuttings from the Delaware, although one grape grower here has been very successful with cuttings from that variety.

VARIETIES.

The different varieties have been so fully described in your horticultural reports that I will try and be brief in what I say in regard to them. The following do well with me: White—Antoinette, Belinda, Duchess, Eldorado, Martha, Pocklington; black—Concord, Janesville, Worden, Rogers 33; red—Brighton, Delaware, Rogers Nos. 3, 9, 15, Wyoming Red and Woodruff's Red.

Antoinette and Belinda are similar, except the latter is a few days the earlier. Both are seedlings of the Concord, hardy, large, productive, delicious and free from disease. Eldorado is my favorite, the earliest and best grape which I have, and the vine is a rank grower. Planted in the vicinity of staminate varieties it does first rate. Duchess is superb, and a good keeper. Martha is a fine grape, sweet and productive. Pocklington is good in dry seasons. Rogers Nos. 3, 9 and 15, are the most productive grapes which I have; large, showy grapes, good quality, long keepers, and hang on the vine well. No. 3, however, loses its flavor after three or four weeks. Everybody knows the Delaware. Wyoming Red is early, productive, hardy, good quality, medium size, and a beautiful red. Brighton is a good grape, of the finest quality, productive and has beautiful bunches. Concord needs no description from me. Worden is very much like Concord, but a trifle earlier. Janesville, hardy, productive; quality, second or third rate. Rogers 33, large, early, showy, productive, compact bunches, good quality. The following varieties have not proved satisfactory with me, viz: Rogers 44, Champion, Lady, Hartford, Moore's Early, Early Victor. Whoever plants Eldorado, Brighton and Rogers No. 9, with Belinda and Antoinette to fertilize them, can have a royal feast on grapes, if they are properly cared for.

TRAINING.

The first year let one cane grow without any trimming except pinching off any side shoots or those which may possibly start out near the crown of the roots. Nor do I allow but one cane to grow the second year, yet, if it is a vigorous vine, I pinch off the end when it has reached four or five feet. After the second year I train the vine horizontally along the lower wire of the trellis and the laterals, which grow from the upper side of the cane, are trained to the upper wires. The buds on the lower side of the main cane are rubbed off or cut out. Of course this main cane is not allowed to run beyond the end of the trellis, but is either pinched off or turned upwards and trained to the post or upper wires. The laterals are cut back each fall to one, two, or three buds, according to the number of laterals or the strength of the cane. Each bud will generally produce three bunches of grapes, and ordinarily twelve or fifteen buds producing 36 to 45 bunches are enough.

FALL PRUNING.

I think the best time for fall pruning is soon after the leaves have fallen. The remaining canes and buds seem to continue to absorb nutriment through the roots, and a large part of the canes having been cut

away, this nutriment gives strength and vigor to the canes and buds which are left, which thus start earlier and with more force and life in the spring. Now, while close fall pruning is one of the secrets of the grape growers' success, yet I have serious doubts as to whether we do not cut back too closely some of our fast growing varieties, like Rogers Hybrids. Would it not be better to leave on more wood, and if too many bunches of grapes appear then thin them out? May it not be possible that the reason that some of the vigorous and rapid growing Rogers Hybrids have bunches which are lacking in compactness, is owing to the fact that they grow so fast that they throw their fruit, as well as to a want of self-fertilizing capacity. And these fast growing varieties often throw out many side shoots which should be taken off, as they sap the very life blood of the bearing canes? Be careful in pruning not to cut too close to the bud, as it may thereby dry out.

I do not believe in the system of training vines with two arms extending in different directions. They look well, both in pictures and on the trellis, and may be commendable for a warm climate, but the experiment brought a loss to me of several vines, which invariably split in two when I attempted to lay them down for fall covering. The renewal system of pruning undoubtedly has many advantages, but as those for whom I am writing will probably do as I have done, never practice it, I shall not discuss it, simply saying that I raise good crops of grapes each year by the method I have adopted.

SUMMER PRUNING.

Here I shall be brief, for with all my experience I don't feel certain as to the best course to pursue. During the season of 1891 I had the best flavored and largest grapes which I ever raised and did not prune any except I pinched back a few of the most rampant growers. I also had a heavy crop. The quality surpassed those of any other season. I believe that good crops of grapes can be raised yearly with little or no summer pruning. Of one thing, however, I feel certain, that the leaves should not be picked off. They are the lungs of the vine, and its life depends upon the leaves. Without leaves the plant would die. Pick off the leaves and the fruit will not ripen. And the fruit needs the shade of the leaves. The leaves need sun, but not so with the fruit. The finest and best flavored grapes hang in shaded places and where the hot sun cannot scald them. It is the greatest folly to remove the foliage of the grape vine. No matter who practices it, it is pernicious. If ever allowable it is only when the leaves become very thick and mildew sets in, and air and sunshine are admitted to get rid of it.

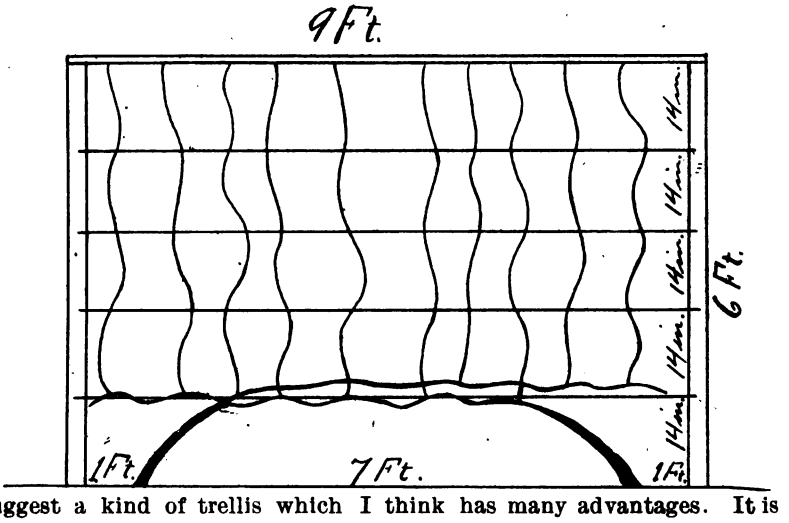
LAYING DOWN AND COVERING.

Vines can be laid down immediately after fall pruning, or at any time before cold, freezing weather. If left till the vines are frozen, they will break, and so they should be laid down while the vine is pliable and will bend easily. The vine should be pressed down close to the soil and fastened with staples driven in across it or held down by a stone, brick or stick of wood, placed so as not to mar the bark of the vine. If, when the vines are first set out, they are placed at an angle of 45° in the row, and in the direction they are to be laid down, it will be much easier and safer bending them to the ground than if set out perpendicularly. The month of November is a good time to cover vines. This climate is too se-

vere to leave vines uncovered, and it will pay to cover them either with dirt, manure or slough hay. Straw with chaff or grain left in it attracts mice. Cover with dirt or manure 3 to 6 inches. Fire-fanged or heated horse manure makes a good covering, but unheated horse manure should not be used as a covering; it is liable to heat around the buds and start them prematurely, and thus kill or weaken them. Do not uncover too early in the spring, and especially do not tie to the trellis until danger from frosts is past. When the new canes first start from the bud they are very tender, and the canes should be tied to the trellis before they have grown too far, or they are liable to be broken off. When vines are covered with manure it can be left on the ground, and thoroughly working it into the ground is beneficial. Grapes will do well on our rich western soil, but they do better if the ground is heavily manured with thoroughly rotted barnyard manure, or ashes. Grapes are great feeders.

TRELLIS.

Were it not for the manner in which the vine grows, when trained to a stake, spreading out in all directions, making it difficult to lay it down flat on the ground for the purpose of covering it for winter, I should think favorably of this mode of training it. It is a cheap and convenient way of training and has many advantages, especially allowing a free circulation of heat and air, and the swaying of the vines when the wind blows prevents germs of mildew from finding a lodging place so easily. I



suggest a kind of trellis which I think has many advantages. It is divided into sections of nine feet each. Each section has two posts nine feet apart, six feet high, with a slat two inches wide connecting the posts on top, with four wires fourteen inches apart, the lower one fourteen inches from the ground and fastened with small staples to the posts. The slat keeps the posts in position and the wires tight. The sections are five feet apart in the row and the rows eight feet apart. Two vines seven feet apart are set in each section one a foot inside of each post, and trained towards each other. This arrangement permits thorough cultivation between the rows lengthwise, and crosswise between the sections, and the air and heat can circulate freely in all directions. In

picking grapes and trimming vines it is convenient, and the two vines in one section can be laid side by side for the purpose of winter covering.

The rows should run north and south, if convenient, because the vines then get the forenoon and afternoon sun; whereas if the rows run east and west only the south side of the vines get the sun. There is another advantage derived from this kind of a trellis. I have learned from experience that some vines like the Eldorado, Brighton, Lindley, (Rogers' No. 9) and some other of the Rogers vines, need fertilizing from the pollen of other vines like the Duchess, Pocklington, Belinda, Antoinette and Concord, and by planting one of these vines at one end of the section, and then the Eldorado, Brighton or Lindley at the other end, letting the two vines run together, we get very satisfactory results, the bunches filling out well and compact.

I suggest to some of my grape growing friends to try this kind of a trellis and report results. It is not expensive, and can be enlarged or lessened in size, and still retain its form and convenience.

HARDINESS OF THE GRAPE.

A great deal has been said and written about the hardiness of the vine, but I have never read any statement in regard to the hardiness of the fruit or grape itself. For several years I have watched this point, and find that the Duchess grape will stand 8 to 10 degrees lower temperature than the Concord or Worden. The latter grape is very thin-skinned and is more easily exposed to frost than any other variety which I have. In the fall of 1891, with a temperature of 24° above zero, the Duchess was not seriously affected. Agawam and Lindley are nearly equal to Duchess in this respect, and are quite good after rather severe frosts. The same may be said of the Delaware. With all its merits the Worden is unfit to eat after our first frosts.

This is quite an important matter, and I hope careful tests will hereafter be made and full reports given. A grape that will withstand most of our frosts until the fore part of October, is certainly much more valuable than one that is seriously injured by the frosts that sometimes come in the fore part of September. What have other members of this society to say upon this question?

DISEASES.

For mildew use sulphur freely, and for black rot I cannot say, unless it is the mixtures recommended by the Agricultural Department at Washington. In seasons of hot, muggy weather mildew has appeared upon Brighton and Rogers 3, 9, 15, and seriously affected them. Only in three seasons has the black rot appeared, and then upon Concord, Rogers 33 and 15. It was partial on Rogers 33 and 15 in the season of 1891. I removed the grapes affected as soon as this disease appeared, and a fair proportion of the other grapes on these vines ripened well. Mildew seems to be freely developed during frequent showers or where there are heavy dews and fogs. Certain spores or germs of fungi then seem to rise from the ground and, floating in the air, lodge on the leaves, berries and young shoots, and develop and spread with great rapidity, if where rain or moisture comes in contact with them. It seems to be a well established fact that vines and grapes grown under cover are never attacked with mildew. The trellis which I have described in this article could be

easily covered with boards or cheap cloth, and thus the injury from this pest averted. If I am correct that the germs or spores of mildew are generated in the ground or on its surface, then would not any substance that would cover the ground, and in which germs or spores could not generate, be a preventive of mildew? Covering the ground with lime or ashes, or having a thick crop of grain growing upon the grounds a few inches high, just before these germs are generated, might also possibly prove a preventive.

REPORT OF COMMITTEE ON GRAPE INSECTS AND DISEASES.

J. S. HARRIS, LA CRESCENT.

Gentlemen and Members of Minnesota State Horticultural Society:

It is evident that Minnesota contains many of the best sites for growing many of the hardy native grapes, and her soil and climate bring a larger size, brighter color, and sprightlier flavor, than any other portion of the American continent; and that the vines are more nearly free from rot, mildew, and the ravages of injurious insects, than in any other part of this country; still, we do not always have perfect immunity from them. In some seasons, there have been cases of mildew, and brown and black rot, but generally it has appeared only in vineyards that were neglected, or that were so located that they had imperfect air circulation, or in some instances where too severe or late summer pruning had been given the previous year. The most troublesome insect has been the little steel blue or grape vine flea beetle [*Graptodera chalybea*, Ill.] The beetle is small, measuring less than one-fifth of an inch in length. Its color is dark steel blue. The characteristic which is at once noticed, is its habit of jumping like a flea. The damage done by the mature beetle is by eating into the buds in early spring, and later gnawing holes into the leaves.

Later in the season the brown, sluggish larva appears upon the upper sides of the leaves, eating holes in them, and frequently skeletonizing them.

The adult beetles pass the winter under the rough bark of supporting posts, under the outer bark at the base of the older vines, in the crevices of wooden trellises, joints of adjoining fences, and under sticks, stones, and other rubbish upon the ground, or in any place that will afford them shelter. During the first warm days of spring, as the buds are beginning to swell, these pests leave their winter quarters, and in the middle of the day find their way to the nearest vines. They have voracious appetites, and at once begin gnawing unsightly holes into the buds; and in vineyards where they are numerous dozens of buds upon every vine are thus destroyed. Upon one side of my own vineyard I have had the damage so great as to reduce the following crop of fruit one-half, and I have heard of some instances in this county (Houston), where the damages were so great as to cause nearly a total failure of the fruit and serious injury to the vines.

After their first hunger is satisfied the beetles pair, and as soon as the leaves have unfolded the females begin to deposit their eggs. The eggs

are laid in irregular clumps of four or five, more or less, upon both the upper and under sides of the leaves. The larvæ hatch from the eggs in a few days, and begin voraciously feeding upon the upper sides of the leaves, eating irregular holes through, and gradually skeletonizing them down to the main ribs. Entomologists say that they require from three weeks to a month to attain their full growth. After attaining full growth they drop from the leaf, and work themselves into the ground an inch or two and transform to pupae. In this state they remain two or three weeks, when the perfect beetles emerge. It is not positively known that more than one brood is produced in a season, but it is very probable that there are two.

The only remedy I have noticed is the following in the report of the entomologist of the United States Department of Agriculture, 1879, page 215, viz.: A strip of cotton cloth, three by six feet, kept open by cross sticks at the ends, is thoroughly saturated with kerosene and held under the vine, while the supporting post is struck a sharp blow with a club. The beetles fall readily by the jar, and contact with the kerosene sooner or later destroys them. With this simple apparatus, three boys can go over a large vineyard almost as fast as they can walk, and if this be done every day for a week, in an infested field, the beetles will be quite thoroughly destroyed; after striking the saturated sheet, the beetles show no disposition to fly or jump. Precautionary measures can be taken that will tend to keep the vineyard comparatively free from the pest. First, a close watch should be kept for the eggs and larva, and they should be promptly destroyed; second, bark on the posts, splinters on the slats, the pruning and other rubbish should be cleared up, raked off and burned at the beginning of winter. It is said that the larvæ may be effectually destroyed by syringing the vines with a solution of whale oil soap—two pounds of soap to fifteen gallons of water. The last season, our vines have been unusually healthy, and the fruit and fruit stems virtually free from rot or mildew. The crop of fruit was above average in quantity, and the quality was the very best.

REPORT ON GRAPES.

E. CRANDALL, SUMTER.

Perhaps what is of the most importance at this time is the subject of grape disease. The past year my vines were entirely free from any disease whatever, either fungous or insect. The only damage to the fruit was from bees, Italian hybrids, regular maffia; and on a few vines that were in the way from chickens, hybrid White Leghorns. I don't think a regular honest brown bee would attack a sound grape, however ripe and sweet, but the hybrid Italian will, for I have seen them do it. At first one fellow makes a pinhole in a sound grape, then others come to the feast and enlarge the hole till they can get their heads in; soon the grape is but a mere empty shell with a round hole and the seed in it.

I have about 275 grape vines in bearing, or just beginning to bear, trained on wires in rows running north and south. Of these 100 are Concords, 90 Salems, 60 Wordens, 15 Brightons; the others are Moore's Early, Prentiss, Vergenes, Hartford, Lady and White Ann Arbor.

My grapes were laid down in the fall and covered with soil. Sometimes I cover them with very coarse manure. Last spring I uncovered them as soon as the ground was all thawed out. They put forth leaves and blossoms in time, and late enough to escape the hard frosts (they sometimes suffer about the last of May) and were in prime condition, that is, healthy and well advanced on the 4th of July.

The very cool weather in July and August alarmed me lest frost should overtake them at the usual time for frost in September. They were late, but the frost was still later—later than usual. Wordens commenced to ripen September 4th, and Hartford, Concord, Brighton, Salem and White Ann Arbor came in succession up to the first of October. Salem ripens better after a frost has killed half the leaves than any other kind and has a good flavor. Concords color after a part of the leaves are killed, but are sour. I marketed about 1200 pounds, besides all we could use in the house for jelly, for canning and eating. The wholesale price was four cents per pound at home and six cents at retail.

I must say that drouth has less affect on a well cultivated vineyard than on any other kind of small fruit grown here. By well cultivated I mean that in times of drouth the ground should be stirred with the horse cultivator as often as once in a week. I have never in the dryest times had grapes fall from drouth with frequent cultivation; whereas without such cultivation, frequently from lack of moisture the stems dried up and were unable to supply nourishment—in fact were dead before the grapes ripened. When I had only a few vines I used to put paper bags on the clusters, which gave them a cleaner appearance, but it was too much labor for anything but experiment and was a help to the night-thieving cowards who are too lazy to raise their own fruit.

DISCUSSION.

Mr. Murray: On the question of the bees puncturing and destroying grapes, I may state that I have been 25 years in the bee business, and that I can keep my bees as near my grapes as I am to these gentlemen here, which is about four feet, and they do not harm the grapes. I have read a great deal on the subject, and watched closely, and I would say that the gentleman makes in his paper one statement that contradicts his own assertion. He says the bees take the grapes and suck out the juices until there is nothing left but the skin, in which there is a little round hole. It is not the bees, but the yellow jackets that make those punctures and cut those little round holes. I have frequently found that to be the case. It is well known by those who understand this question that the yellow jackets do this. The yellow jacket makes that puncture, and then the bees, after the grape is cracked or punctured, either by the yellow jackets or in any other way, pitch in for their share of the juices. But that does not occur until after the skin is broken. That is what has given the

gentleman the impression that the bees did it. But the fact that that little round hole was left there proves to me that the yellow jackets made it, not the bees.

Mr. Wilcox: I believe that it has been well established that the honey bee cannot puncture the skin, or the little film or inner skin that surrounds the grape. This has been demonstrated in our society by overwhelming evidence.

Mr. Cutler: I will state that when the material for honey was very scarce last summer the bees came and settled in swarms upon my raspberry bushes so thickly that a lady could not go in there and pick the fruit. I know that they punctured the cuticle of the raspberry. They did not touch my grapes, although they were within two rods of my bee hives.

Mr. Wilcox: I will state the experiment of Prof. McLean, in which he confined colonies of bees in a glass house and took their food away from them so as to bring them into a starving condition, and hung bunches of grapes of different varieties all around inside of the house, and even hung bunches of grapes inside of the hives, and kept them so confined until the bees died of starvation. There was not a single grape injured by them. But as soon as grapes were punctured even with a needle, so as to penetrate the epidermis, then they went in and cleaned them out entirely. That is the entire basis of these charges against the honey bees. It has been my experience that whenever any bird or insect once punctures the skin of a grape, then the bees take possession and clean out the grape. But they have no biter by which they can penetrate the skin of a sound grape. This fallacy is one that the bee keepers of this country have been obliged to fight for years and years, and yet it has many times been proved to be wrong.

Mr. Harris: I do not believe that the honey bee injures the grape, that is, the sound grape.

DISCUSSION ON THE JANESVILLE, &C.

Mr. Sampson: I would not like to have it go out that the Janesville grape is the best grape, because I do not believe that it is. I have grapes that I consider very much better than the Janesville.

Mr. Cook: What are they?

Mr. Sampson: Well, among others I will name Moore's Early and the Delaware. We cannot sell the Janesville.

Dr. Frisselle: My experience has been that the Janesville grape is an abomination. No man nor woman buys it more than once. It looks well, but it is not fit to eat. As the last speaker remarked, there are plenty of others that are much better.

Mr. Harris: I shall still recommend the Janesville. However, I think thatthe Early Victor would be a good substitute for it as a table grape. I think, in the country where Mr. Cook resides, the best system of raising grapes would be to train them on short sticks.

Mr. Ludlow: I will say that with that kind of training I don't think you could get through the field. I have known that kind of a grape to grow twenty feet in one summer. I have had to pinch mine off from three to five times in order to get through the trellises, because they grow so fast on our rich prairie soil. The Clinton with me acts about the same as the Janesville. It is a sour grape but needs no covering.

Mr. Cutts: I grow the Janesville and its twin sister the Champion, on account of their extreme hardiness, vigorous growth and abundant yield. I would say that this matter of taste is largely one of fancy. A year ago I received a visit from a farmer who has raised a great deal of fruit, but never had much to do with grapes. It was somewhat early in the season, and while we were going through my grapes I handed him a bunch of Champions. He ate them with apparent relish and said that they were fine, and stated that if he could raise grapes like that he would be perfectly satisfied. I then took him down a few rows further and gave him a bunch of Moore's Early. "Well," he said, "I had no idea that there was that difference in grapes." So I came to the conclusion that people are satisfied with the Champion and Janesville,

Dr. Frisselle: In regard to the ripening of the Clinton I noticed that the gentleman made a statement that he could not ripen his grapes very well until the frosts had destroyed the leaves on the vines. That statement might give somebody the impression that if he could only get the leaves off from his vines in some way or other, it would accelerate the ripening of his fruit. This is an error. I know a man who acted on this supposition and stripped off the leaves from his vines. He waited and waited for his fruit to ripen, and I guess he is waiting yet. (Laughter.) The fact about the Clinton being ripened by the frosts is this: the Clinton is a wild grape and the frosts sweeten it.

SMALL FRUITS.

REPORT ON SMALL FRUITS.

DEWAIN COOK, WINDOM.

Small fruits are not extensively grown in this section, there being no one growing them for market except myself.

The currant, strawberry and raspberry do admirably well on our black prairie soil.

Of strawberries the Crescent and Downer's Prolific have proved the most profitable with me. There is a variety, said to be the Hovey, that has found a place in some of our farm gardens for a good many years. It is very hardy and productive. It is late, very small and soft, and produces wonderfully even in grass and weeds.

The Juneberry is at home here; it is perfectly hardy, and very productive, but I don't think it will ever rank very high as a market fruit.

The currant is probably grown more in our gardens than any other one fruit, and is very popular. The Red Dutch, White Grape, Victoria and Long Bunch Holland are the varieties mostly grown.

Of raspberries, the Turner is the only variety that has got a foothold among farmers here. It is deservedly a very popular home berry, but I have discarded it for market, mainly on account of its fruit being soft, and difficult to gather, and it is also rather small. The following varieties I find profitable for market: Marlboro, Superb, Brandywine and Cuthbert, for reds; Souhegan, Ohio and Gregg, for blacks.

As to grapes, the Concord takes the lead. A few of our Russian and German neighbors are growing it for wine, but it sometimes fails to ripen perfectly on our heavy, black soil. Very many of our early and hardy varieties of grapes will succeed fairly well here, but it is probable that grape growing for market will never be a leading industry with us. I consider the Concord, Worden and Champion the three best varieties for market.

The blackberry does not grow to perfection here; it is likely that if we could grow them in partial shade, and give them winter protection, that we could grow them, at least for home use.

DISCUSSION.

Mr. Underwood: I would like to have Mr. Cook inform us about the productiveness of the dewberry?

Mr. Cook: I have introduced the dewberry and sent it around pretty widely. Among other varieties that I have tested are the Baratelle and the Mammoth. After considerable trial I now think that they are not as profitable to the beginner in fruit growing as some of the other berries. I think he had better first grow the strawberry, and then the raspberry, and then if he wants something in the blackberry line let him take up the dewberry. It will stand our dry winds better than the blackberry, but where the blackberry can be grown successfully it is useless to try the dewberry. I have grown some very fine dewberries this year in the shade, where it was so dense that I had to hunt for the vines. It seems to need the shade.

Mr. Underwood: Does it need covering?

Mr. Cook: I have found that it does.

Mr. Harris: Do you cultivate the dewberries?

Mr. Cook: I have used a cultivator but I am now trying them without, by letting them grow in the long grass. I let them go about two years and then plow over again.

Mr. Sampson: Do you prune the dewberry?

Mr. Cook: No, sir, I do not.

Mr. Perry: I wish to take exception to the expressions in regard to the Turner. I think the Turner is the standard berry for Minnesota. There is one thing more I want to note—you must keep down the suckers thoroughly.

Mr. Sampson: The Turner mildewed with me, but perhaps it was because my soil is too rich.

Mr. Thayer: Is your raspberry patch on wet ground?

Mr. Sampson: No, it is on very dry ground on the eastern slope of a side hill.

Mr. Ludlow: The only nice Turners I ever grew were in the shade of my black walnut tree. Where they are put out in the sun they dry up with me a good deal worse than some other varieties. I find that the Clark has done the best with me.

Mr. Richardson: I have tried the Clark some twenty years, and I could not make it succeed because it always winter killed. My experience has been that the Turner is far ahead of it. I got my Clarks of Mr. Knox, of Pittsburg, Pa., so they

were certainly true Clarks. My experience has been more satisfactory with the Turner.

Mr. Thayer: I have grown the Turner for ten years, and have never had any trouble with the mildew.

Mr. Ludlow: I have four rows of Clarks on the north side of my patch next to the lake, where it is as bleak as it well can be, and I have never seen one Clark frozen back. The next seven rows are Turners and they invariably freeze back.

Mrs. Kennedy: I have three-quarters of an acre of Turners, and they are on a western slope on sandy ground. I have never failed to raise a crop. They are perfectly hardy. I think, however, that a difference in the soil may make a difference in the flavor. I raised sixteen hundred quarts on three-quarters of an acre this year. Although it was very dry, they were not mulched.

Vice-President Wedge: The Turner has proved the most reliable berry with me.

REPORT ON SMALL FRUITS.

M. CUTLER, SUMTER, THIRD CONG. DIST.

To the Members of the Minnesota State Horticultural Society:—The first part of the past season was very dry and discouraging to the novice in horticulture, as well as to the expert who wished to extend his plantations.

Thousands of costly plants were purchased, carefully set, watered and nursed, only to wither and die. The earth was as a bed of dry ashes, carried hither and thither by the high winds. Surely he who can invent a plan for setting out plants during such an unfavorable time will confer a blessing on the average small fruit grower.

As an experiment we tried setting two rows of strawberry plants about ten rods long, as follows: We dug holes in the dry dirt and poured in about one pint of water. Taking the plants from a pail of water we placed them in the holes and firmly pressed the earth about them, then covered with a little hay, leaving it on about a week. The experiment proved entirely satisfactory. Plants set about the same time without being covered, nearly all died. I set about one-half acre of strawberry plants after the rains came the last of May, that made a good growth and went into winter quarters in good condition.

Strawberry plantations that had been well cared for produced a fair crop that sold well. Turner and Cuthbert raspberries that had been well cared for produced a large crop of fine berries. I had one-half acre of Cuthberts that were very nice. They were mulched with barn-yard litter. Tyler, Souhegan, Ohio and Gregg blackcaps bore a good crop of fine fruit. Average price of raspberries 12½ cents. Currants that had been properly fertilized and cultivated bore a large crop and were in good demand.

Owing to the ravages of the mildew and worms, gooseberries are nearly extinct. Such grapes as Concord, Worden, Moore's Early and Brighton will do well in most parts of our district, and produced some fruit the past season. So far as known, grape vines have not been affected by disease in my county, and this fine fruit should be found in every farmer's and villager's garden. Crab apples and wild plums were not very plenty. Judging by the reports we hear of the success of tree agents in our county, it will soon be a veritable garden of Eden.

SMALL FRUITS IN SOUTHWESTERN MINNESOTA.

DEWAIN COOK, WINDOM.

In presenting this paper, it is not my object to tell what we have in the way of small fruit, but what we should and what we can have. The varieties and methods recommended are not intended for the horticulturist who aims to grow fancy berries for market, but rather for the farmer who would like to grow cheaply and with certainty an abundance of small fruits in their season.

Our soil is mostly black prairie loam. The plowed fields are generally bare of snow the entire winter, and plants are more subject to root injury and root killing than in a timbered country, and the methods that bring the best results in the older horticultural districts often have to be greatly modified, if not altogether changed, to meet the requirements of our different conditions.

One of the drawbacks to horticulture is the farmer buying the new high-priced varieties of fruits, when perhaps he has not any of the standard varieties. When he buys he wants the best there is, and since he buys his plants as he buys his machinery, with the latest improvements, he is about sure to fail with them. A high-priced variety means a variety not in general cultivation. I would say to the beginner, buy no high-priced variety of fruit plants.

The strawberry is at home with us. The Crescent and Downer's Prolific are varieties that make a good combination. For those who want to grow only one variety, I know of nothing better than the Downer's Prolific. The plants should be set in the spring, in rows about four feet apart and the plants about eighteen inches apart, growing them in matted rows, keeping well cultivated and free of weeds the season set. In early winter the strawberry should be covered with a mulching of straw, straw manure or other coarse litter. In late spring this covering should be raked off the plants into the alleys between the rows and left there This bed will need no more care, and will furnish fruit for the family for three or four years. Strawberries will do better if set where the wind will not blow the snow from off the plants.

Red raspberries as a rule are hardy with us, needing no winter protection. They should be set in rows six or seven feet apart, with the plants about two and one-half feet in the row, and kept free from weeds the first and second season. After this the plants will choke the weeds out. Let them grow in matted rows a foot or so wide, and don't worry about the old dead

canes, as they do no harm and help catch the drifting snow. Red raspberries will succeed in almost any location, but I sometimes think that the best place for them is out in the open field, where they will drift nearly full of snow, about the first snow that falls. I give the Turner first place on the list for home use, and for late raspberries I would recommend the Cuthbert, though I sometimes think the Brandywine should have that place of honor.

The Dwarf Juneberry is perfectly hardy and should have a place in every home garden; it nicely fills in the gap between strawberry and raspberry.

All the standard varieties of red currants do well here. They are perfectly hardy, and for best results should be set in very rich soil, in rows about six feet apart, and about five feet apart in the row; the old wood should be pruned out; where cultivation is kept up, we have but little trouble with the currant worm.

The gooseberry also does fairly well with us, and every garden should have a few hills at least.

The grape is rarely found in the garden in this section. It demands greater care in the way of winter protection than any of the fruits above enumerated, but with a little care every farmer and every lot owner in southwestern Minnesota can have an abundance of grapes in their season and far cheaper than he can buy them. Grape vines should be set, if possible, near the south side of a windbreak, where the vines will be deeply covered in winter by the drifted snow. It is useless to plant the vine in any other than a protected locality. Cover the vine in the fall with coarse manure, uncover in late spring, and tie to the trellis. The various systems of pruning have but little application to our needs, the main thing here being winter protection. When the vine gets so large that it is difficult to give it sufficient winter protection, then cut out the largest canes. The science of pruning is a bugbear that deters many of our farmers from planting the vine. The Janesville and Concord, early and late, are the two varieties that anyone can hardly fail to succeed with.

Here we have a succession of fresh fruits from early in June until late in the fall, and every land owner can have them with certainty and with but little trouble—and why not have them? In the journey of life, why go by the way of the desert when the other road abounds in fruits of various kinds, more especially with small fruits.

MY EXPERIENCE IN RAISING BLACKBERRIES.

S. CUTLER, EXCELSIOR.

I commenced about eight years ago with fifty Snyder blackberry plants, and have been experimenting with blackberries of different sorts ever since. I now have one acre in bearing.

During these eight years I have learned a good deal about the blackberry. The first thing is to get a good variety to start with. Do not take any kind of a bush that you may chance to spy in some fence corner and set it out with the expectation of making a success with blackberries, for you

are almost sure to fail—but go to some reliable nurseryman and get plants that have been thoroughly tried in the latitude in which you live, and are of a good variety. If I were to recommend any variety it would be the Ancient Briton, as preferable in many respects to most of the others. It is a hardy plant, and being of medium growth makes it quite easy to lay it down in the fall, and the fruit when properly ripened is all that could be desired in a blackberry. It is an abundant fruiter, and as it is a little later than some of the other sorts, there is a good demand for them at a good price.

Blackberries need plenty of moisture, and it will not pay to plant them on the top of some dry knoll, for the fruit will not grow to perfection in such dry places, it will be hard and sour. Choose a place where the ground is of good quality and where there is plenty of moisture. Prepare the ground thoroughly by plowing and harrowing before planting, and make the ground mellow, down quite deep, where you set the plants. You cannot be too particular in this respect—remember you are setting them out for profit and not simply to see whether they will grow or not. I think they should be set about four feet apart one way, and eight feet the other way. Keep the ground loose by constant cultivation, and the sooner you can get a good large bush, the sooner you will get fruit, and keeping the ground loose will help to keep it moist.

When the bushes get quite well started (say three years after they have been set), it will be some trouble to remove the old brush; this I do in the following manner: I take a hooked knife, with a handle attached which is about five feet long. The knife is made from a piece of old file welded to a hoe shank in such a way that the knife stands at right angles with the handle. With this kind of a tool I cut the brush out of an acre in eleven hours, and as I cut them I pull them out of the row with the knife, so I can gather them easily. I next hitch a horse to the side of one-half of a two-horse harrow, and drive over the brush with the horse and harrow, which draws them together into piles, and, if in a dry time, the harrow will break the brush so there will not seem to be more than one-half as many of them after being harrowed as before.

After the brush is piled, I hitch the horse to a sled made of wood without any shafts, and with four stakes in it to hold the brush on; with this I haul the brush out of the field. I think the old brush should be taken out as soon as practicable after they have fruited, as it keeps the new shoots from making as good a growth as they otherwise would, if left in.

Blackberries, to be grown successfully, must be covered in the fall; if not covered, they should be put close to the ground and fastened there till spring. I commence to put them down by digging the dirt away on one side so as to let the bushes over; then I stand on the opposite side, and with a fork, which I place in the top of the bush, I commence to push with the fork and at the same time push with my foot against the stump of the bush; with this method I have no trouble in getting the bushes down, when they should be covered with enough dirt to keep them on the ground. I do not think it is of much advantage to entirely cover them with dirt, especially when there is plenty of snow. I think as a general thing, the bushes should be taken out of the ground as soon as the frost is out deep enough to allow of it, as being a late bloomer, there is not much danger from frost. It is better not to stand the bushes

erect, when taken up, as those left near the ground bear the nicest berries. Mulching the ground with wild hay, straw, corn stalks, etc., adds greatly to the growth of the plant and size of the berry.

DISCUSSION.

Mr. Hamilton: The subject of blackberry raising is one that has had much attention paid to it throughout the country. Perhaps it might be of some interest to you to know something of the starting point of the Ancient Briton. The Ancient Briton was brought over to this country in 1852 by a man named Guy, who lived in the town of Ashland, Dodge County, Wis. Upon receiving this bundle of roots he thought he would throw them away, and not bother with them. But he left them out on the ground over night, and the next morning repenting somewhat of his decision, he took them and set them out in the ground. I have heard that he made the statement afterwards, that this was the only variety that ever repaid the pains he took in cultivating them. This same variety of Ancient Briton was afterwards distributed throughout the country by a man named Robert Haskell who lived in the same town. I will say, coming down to the present time, that we have found nothing in our locality that compares with the Briton. I think that the verdict of the people in our town is, that the Briton is the main variety, because in the 125 or 150 acres of blackberries that are growing in our vicinity, you will not find any other variety grown besides the Ancient Briton, except the Snyder. I would say that I have tried Taylor's Prolific and it was not satisfactory; neither was the Early Harvest.

Mr. Wilcox; Has there been any other blackberry masquerading under the name of the Ancient Briton? Mr. T. T. Lyon gives the origin of the Briton as Arkansas, and some of the descriptions of it do not agree with the descriptions of the standard Wisconsin berry.

Mr. Hamilton: I have been told, in traveling over the country, by different berry raisers, that they had the genuine Ancient Briton, but I am sorry to say—believing that we have the genuine Ancient Briton—that those so called Britons were not the genuine Britons. In fact, I know that Snyders have been sold before now as Ancient Britons. I know some of the parties who have done that, but I don't think they did it knowingly. There are a great many acres of the so-called Briton plants, that I claim are nothing but the Snyder.

Dr. Frisselle: Where were they originally brought from?

Mr. Hamilton: From Wales.

Dr. Frisselle: What is your opinion of the Snyder?

Mr. Hamilton: I think that it is a little hardier than the Briton, and in some respects it is a better berry than the Briton for the farmer, because it is almost impossible to get our farmers to take any care of the blackberry. I think the chances of the Snyder living through the cold weather is better than that of the Briton. I would be glad to find a blackberry that is perfectly hardy.

Mr. Wilcox: Is the Snyder productive on sandy soil?

Mr. Hamilton: Yes, sir, it is.

Mr. Ludlow; I find that the Briton holds the size all through the season. The Snyder gets very small along towards the last.

A Member: I think that must be owing to the dry weather. I have never noticed anything of the kind with my Snyders.

Mr. Ludlow: That may be so. The first year I put them out they did not grow small as in later years, and I remember now that first year was a wet year.

A WOMAN'S EXPERIENCE IN RAISING SMALL FRUITS.

MRS. ANNA B. UNDERWOOD, LAKE CITY.

Experience implies failures as well as successes, and these are not always pleasant to contemplate or rehearse. The thought of a failure, even in review, has a depressing effect, and to a great extent modifies the keen pleasures of success; still failures are lessons and, if followed by improvement, are profitable. Continuous good crops, just think how monotonous it would be! Always good crops! How tiresomely dull as compared with the excitement of an occasional bad year, the delightful uncertainties of every year until the crop is harvested, and account of stock taken and balance struck, and you know whether it is on the Dr. or Cr. side. The old trite saying "Variety is the spice of life," is true with regard to the "small fruit" industry. Why, there would be no earthly need of horticultural societies, if there were no failures to recount! And just think how much we should miss! Really we must admit that failures are useful, necessary and entertaining—to others.

To give a detailed account since 1884, when I first took up the work, would fill too many pages and take up too much time; and I take it, that to give methods of procedure during the past eight years, would be simply reiterating what has been said, and so well said, over and over again at the yearly meetings of the Horticultural Society, and embodied in their reports.

The subject, perhaps, had better be handled in a general way, giving an idea of the estimated profits of the years taken together, and not of single years.

Beginning with strawberries: The main idea of taking up small fruit culture, was to raise all that was needed for the house, and sell the balance, if any. Gradually this idea was enlarged upon, for it soon became apparent that it would take but little more labor to increase the plant and so supply the home market, and at the same time make it profitable.

Of course, the first year in strawberry growing was all expenditure, nothing coming in, and ever after that one or more beds were in that condition; then some years, owing to drouth, the yield would be short; other years, heavy rains just at the blossoming period would give ill formed berries, many blasted—and again short crops; then as last season, heavy rains would give beautiful large berries, but so soft as to melt down in a day, being worthless for shipping, and taking lively manipulation and planning to dispose of them before they were a shapeless mass. Now take these years and allow two full crops, and the average for the seven years will be half of a crop for each year.

Has this paid? Yes, for the amount invested, and land occupied, 10 to 15 per cent. has been cleared over and above all expenses, and withal the pleasure of having berries, the finest of the field, on our table three times a day in unstinted quantities.

I have always done well on berries sold in the home market, but the commission men, they aim to send you just enough to pay for picking and boxing, and sometimes fall short of even that.

RASPBERRIES.

Red raspberries are in greater demand than the black, but owing to the fact that it costs one cent more per quart to pick them, and their having a bad habit of settling in the box, they are not as profitable as the black. It is also impossible to get any more per quart, therefore the profits on the red must be estimated at from 2 to 2½ cents less per quart.

The black raspberries and blackberries are the most profitable of all the small fruits; still, after footing up the cost of the plant, setting, cultivating, training, clearing, covering and uncovering, posts, wire, manuring and rent of ground for three years, and then picking, boxing and handling, the profits are *not* stupendous—simply moderate. For, as with strawberries, the elements have to be considered. Drouth or heavy rains during the blossoming, lessen the yield greatly. One year a hail storm struck the growing canes about four to six inches from the ground, and fully one-half were broken off entirely; of the balance about one-half were injured so that in covering them they broke off. The result of this havoc was, of course, only one-fourth of a crop for the following year. Twenty per cent. on the amount invested is *not* an under estimation of the profits accruing from raspberry and blackberry culture.

Currants and gooseberries, when covered up, have yielded well. I have not a very large plant, as the market has not warranted much effort in this line, so many home gardens raising more than the owners need, and neighbors supplied for little or nothing. So far it has cost about three cents per quart to pick, box and handle, and five cents per quart was all that could be obtained; so that after counting labor, money invested, &c, there

has not been much left but the fun of raising them, and feeling that you have had a succession of fruits.

Grapes: Last, but not least, comes grapes. There are about 1,000 vines in my vineyard, of about twenty varieties, mainly Delaware, Moore's Early, Agawam, Concord, Brighton and about fifty vines of different kinds of white. I am gradually lessening the number of varieties, for although pleasant to have a variety for home use, and for shipping and general market purposes a few well chosen varieties are better. The most profitable are, first, Brighton and Moore's Early; second, Delaware and Concord; third, the balance if they ripen. My greatest trouble with grapes has been frosts at both ends of the season. Grapes being a good shipping fruit, pay better for this purpose than for distribution in the home market, as that is spoiled by the immense quantities of Concords shipped up from below, which retail at twenty-five cents and less per basket. The wonder is how much the shippers net after commission and express charges are paid. From a few bits of "commission" experience that I have had, they have only the satisfaction of knowing that their grapes did not rot on the vines.

During seven years there have been two total failures of crop by freezing on the vines before ripening. One year my Delawares blighted badly, and what little fruit there was, was worthless. The Moore's Early and Brighton have failed in bringing in good returns.

So many are engaged in raising grapes in the small villages and towns along the river, and willing to take anything for their fruit, that it ruins the market. For profit on grapes, I think five per cent. net would be a fair average for the past seven years. It must be remembered that two of these years were growing years, no returns whatever in fruit.

To sum up, in what has been said it must be apparent to everyone that there has been a good deal of experimenting, and that perhaps the next seven years will mark a greater advance in profits. In one way I know it will show a gain, and that is, in the number of *boxes* of fruit raised.

For years, to give honest quart measure has been my aim; but when cases come into your market filled with boxes holding a little over a pint of rather mussy berries, that will sell readily at ten cents, while your honest quart, heaped up with fresh assorted berries, goes begging at twelve and one-half cents, you begin to wonder, and finally resolve that if the dear people want to be humbugged, it must be done.

A few large fruit growers were visited last season and interviewed on this subject. They all used "scant quarts," and all said that there were so many unscrupulous growers using the "short" or "scant" boxes and selling at lower prices, and as the public would take them in preference to an honest measure at a little higher price, that to protect themselves, they had to take up scant measure; quieting their conscience, as one assured me, by thinking "we sell by the *box* and not by the quart."

Perhaps it is all right.

The same with grapes—9 pounds in a 10 pound basket won't bring any more than 7 pounds in an 8 pound basket. "A basket is a basket, no matter about the size."

Now, as to the advisability of women entering this field of work, small fruit culture. If a woman has to do her own work and sewing, she has all the physical exercise and responsibility she is capable of, and to take up more to do would be ruinous. If she can be relieved of the work and

care of the house, simply directing others, and give her time and strength to small fruit culture, she can make it profitable. Of course, there must first be a natural adaptability to that kind of work; she must love to be out of doors, she must love to work, must feel an enthusiasm that will prompt her to go out in all kinds of weather to watch and learn, ready to weigh carefully all innovations, and where worthy grasp and put in practice. Go slow and steady, not venturing too much in any one direction. It requires as close management in this as in other avocations to make the profit desired, and it takes time and experience to develop all resources. Of course, close proximity to market or a shipping point is indispensible, particularly for berries, as carrying even a mile on smooth roads with a spring wagon, is apt to take the freshness off, if ripe and ready for table.

DISCUSSION.

Mr. Ludlow: Mrs. Underwood's experience in trying to sell honest quarts has been mine exactly. I will relate a little incident in point. I brought over a lot of strawberries to town, and tried to sell them. The hotel keeper asked me the price, and as they were very nice berries indeed, I told him 20 cents a quart, but he said that he could get them for 15 cents. I told him that my quarts were larger and, therefore, just as cheap. "Oh," he said, "you can't fool me that way." I went on and sold them elsewhere. I afterwards learned that he told around that I was trying to beat him out of five cents a quart, when the facts of the case were that two quarts of mine would have made three of his.

Dr. Frisselle: I think that honesty is the best policy. I think that if this gentleman will only keep his course of action up long enough, he will come out on top. I do not believe in selling short quarts or short measure for full measure.

Mr. Thayer: I wish to commend the full quart measure, for I believe it is best. I have one instance right in your own state. I received many letters saying, "We are getting berries at about two cents less than yours. Can't you make yours lower to meet these prices?" Of course, we didn't do it. A gentleman in Jackson wrote to me and made that request and we refused to grant it. "Well," he says, "send them along, and send us some empty boxes with them. I find I can take your berries and manipulate them, and get more out of them than I can out of the others. They are really a better berry than we get from the south." My experience is this, that good measure and even quality throughout the box will pay you better than any other portion of your work. (Applause.)

Mr. Perry: The question of boxes came up a year or two ago. Now, what we call the short box to-day is the very box which is shipped all over the country. It is not dishonest to use that box because it is the commercial box by universal agreement. There is no other box used to any extent. Of course, when parties are dealing in local markets, where they are selling by the quart, there is nothing to be said. But if you are selling to commission houses right along, you will find the short quart is the commercial quart of to-day. No other is now used. I have got some of the large boxes stored in my cellar that I sent south for and could not use, because I could not get the crates to ship the boxes in.

Dr. Frisselle: I have had a little experience in this short box business myself, and have made some observations among the commission men in the city of Minneapolis. My experience is quite the reverse of that of the gentleman who last spoke. I have heard commission men say over and over again, "Here is a man (calling him by name) whose fruit is always to be depended upon. It is the same in the bottom of the basket and box as it is on top. His boxes are always full, and we only need to have his name on the crate in order to sell the fruit without looking at it." That is the kind of a reputation for a man to have. I know of other men who have the reputation of giving scant measure always; and I also know that they have difficulty in marketing their fruit because it is scant and poor, and put up with an idea of humbugging the people and making them believe that they were getting good fruit, when they were not. I know that that kind of a reputation is not a profitable one, and I hope that nobody will be encouraged to do that sort of work.

Mr. Perry: I think the doctor is a little at fault. He has introduced a subject that I did not discuss. That is the quality and the filling of the boxes. I would ask Dr. Frisselle where he got his boxes last year—his berry boxes?

Dr. Frisselle: I bought them of Mr. Smith, in the city.

Mr. Perry: Then in that case you got the short boxes, as we call them.

Mr. Harris: I have had considerable correspondence with different box makers, and they say that they do not send out the old boxes any more. Now, in regard to using the short boxes I would say that I kept up the practice of sending out the old boxes until this season. When I figured up the hundreds and thousands of dollars that I have given the dealers in

the past, by the use of the old boxes, I concluded that the old boxes had gone by.

Mrs. Kennedy: We buy our boxes of Wells & Co., and I have taken my berries down to the store, and have noticed the store keepers empty them out and have compared our boxes with some of the other boxes in the store, and two of our boxes would hold as many berries as three of the others.

Dr. Frisselle: I would say, in answer to Mr. Perry, that when I order standard boxes I expect to get standard boxes. If I should order wine measure boxes, I should expect to get short boxes, but I do not order them. I order the standard boxes, that hold full quarts.

Mr. Perry: I have used Mr. Smith's boxes and Mr. Chandler's for several years, and they are just the same. In regard to the large boxes, I will say that you cannot get the crates to ship them in.

STRAWBERRY CULTURE.

JOHN LITTLE, GRANTON, ONT., CAN.

Our past experience has been our teacher, and after years of study we have come to the conclusion that good returns cannot be realized unless high culture is put in practice.

It may seem useless to cultivate each week or after a rain, as soon as the soil is in fit condition to work, but if you will follow this practice you will find much better returns.

The following plan you will find successful: Never plow sod for berries, but use soil free from weeds, that has been worked before.

In choosing soil for growing this fruit you should select moist clay, loam or sandy soil. Very few strawberries do well on light soil, they require moisture, and by thorough cultivation, with plenty of manure, you can retain this moisture in the soil. It is useless to try to grow fruit on poor soil, unless heavily manured. As a fertilizer we have found stable manure the best, and it heads the list; this should be made as fine as possible; but if you desire to use any commercial fertilizer use bone meal, which stands at the head of the list. Remember that to get the best results from this it has to be applied one year before it acts as a plant food, so that it can be decomposed. Cow manure (separately), should not be used for strawberries. as it causes grubs, which destroy many plants.

A remedy for the grub is plenty of *manure*, and if this is used you may expect very little trouble. This was very thoroughly tested some time ago, and where little or no manure was used, there was where the plants were destroyed. We believe that the best results can be obtained

by spreading manure on the soil after it is plowed. Plow deep and have every foot turned; then the manure should be spread from two to three inches deep, and should be worked in with the cultivator and harrow. As the roots of the strawberry do not go into the ground very deep, we think this the best way, as they should not have to hunt for fertility, but have it at hand. You cannot have your soil in too good a condition; it should be so fine that all things favorable are at hand. Much has been said in regard to hill and matted-row systems, but I believe in a compromise between the two. Hill culture does not yield enough fruit and the matted-row makes the fruit small, but the compromise gives you good sized fruit and a good profit. High culture, plenty of fertilizers, with a moist soil will produce good results to the grower.

Every year I plant less or more of the new varieties, and this year I got Gov. Hoard, Martha, Middlefield, Lovett's Early, Boynton, Shuster's Gem, Parker Earle, Barton's Eclipse, Bessie, Jefferson, Regina, Westbrook, Auburn, Gillispie and Princess—also all the old stand-bys. I have two Canada seedlings that I have found none to excel, namely Woolverton and Saunders. Parker Earle will never be a profitable market variety—it has the failing of the Jewell, it does not produce numerous enough nor is it large enough.

RASPBERRY FARMING.

AT HIGHLAND FRUIT FARM AND VINEYARD, EXCELSIOR, MINN. P. H. PERRY.

Introduction.—In this short paper we shall advance no theories to be exploded, nor give you a history of the many theories of old horticulturists that we have exploded; but simply give the practical methods employed by us in the cultivation of the raspberry on a large scale, where we are growing every thing from a strawberry to a standard and Russian apple—also the celebrated Minnetonka grape.

VARIETIES.

The red, for early, the Turner; for late, Cuthbert. The black, for early, the Doolittle; for late, Gregg.

LOCATION.

An elevated well drained location is preferred; and if at any time on the plantation water is found to stand, an open or under drain should be put in.

SOIL.

Any soil that produces a good crop of corn, will grow a full crop of berries; although I have grown very fine crops of very large fruit from soil that would not produce more than half a crop of corn.

PLAN.

Lay out each plantation as nearly square as practicable, and on all four sides leave eight feet, upon which to turn the horse when cultivating. Plant in check rows, that is, the same distance each way. By this plan we have each variety by itself and keep it perfectly pure.

PREPARING GROUND.

Thoroughly cultivate in corn or root crop for at least one year; then plow deep and use sub-soiler if you can.

PLANTING.

Plant with team, plow and an extra man. Set stakes eight feet from the side of the plantation and then run a furrow perfectly straight, and, if planting Turners, set the next row four to four and one-half feet from the first, and furrow out uniformly until within eight feet of the opposite side of the piece to be planted. Next take stakes and a strong cord, and set the stakes eight feet from the end of the plantation, and set with plants already heeled in at the side of the plantation. The two men will make short work of planting one, two or five acres. The second row is planted the same distance from the first as the furrows are from each other. Of course, you will plant in the open furrow, and by planting two plants to the hill, you will be surer of a complete success. If planting Cuthberts or black caps, line out from five to six feet, and stop when you get within eight feet of the opposite end of the plantation. With this method you have an eight foot street on all four sides, on which to turn or drive around the piece.

CULTIVATION.

Cultivate with a horse and corn plow the same as corn, and continue up to near picking time; also in the fall, keeping the ground free from weeds and suckers.

PRUNING.

Pruning a new plantation: Pinch when canes are from twelve to eighteen inches high—old plantations from two to three feet high. To remove old canes, suckers, etc., use a straight-bladed corn knife with the blade shortened about one-third, and by selecting from four to six canes and putting them to one side all the old bush and surplus canes can be cut away by one or two strokes. A good man will clean out an acre daily.

PICKING.

Each picker is furnished with a crate, and when filled it is marked and stored in the fruit house and another taken; and at the time of shipping or at the close of the day's work, each picker is to identify his crates, and settlements are made each day in cash. With our method we inspect each picker's work at every time of settlement, and in that way know the quality and amount of the work done by each; and in all cases when the work is not satisfactory or the amount not up to the average, we notify the picker to improve, and if he does not do it we dismiss him. With our method settlements are made with 30 or 40 pickers in a very few minutes.

MARKETING.

We pick each plantation three times a week, and with care that no ripe fruit is left on the bushes, and in that way we avoid the too common mistakes of having over-ripe fruit mixed with fresh fruit, and spoiling the whole. All raspberries are picked and marketed by us in pint boxes—not picked into quart boxes and then turned into pints, as this crushes the fruit more or less. We have shipped to the trade direct and also to all

the leading commission houses. Some have been slow in making settlements, and prices very unsatisfactory. Others have been prompt, and a check mailed with account sales and prices very satisfactory. When you find a firm that knows the difference between poorly picked, soft and inferior fruit, and fine, fresh picked, sound fruit, and knows enough to ask and get good prices for good, fresh stock, that is the house to tie to. We have found that it pays to be very careful, and have each package well filled, and sent in fresh new crates and boxes, and to forward to the market as soon as possible after being picked.

COVERING.

To put down the canes, use a spading fork to loosen around the hill, and lay them down close to the ground all one way, and with a plow cover as much as possible.

YIELD.

My Turners have always given a fine crop without protection; the fruit being large, to very large.

My Cuthberts have been laid down and have been a sure crop of extra large fruit. The yield of both Turners and Cuthberts has been from 5,000 to 8,000 boxes per acre.

OTHER VARIETIES.

We have only mentioned the four leading market berries, though we have others worthy of mention.

Carolina; a beautiful amber, perfectly hardy, very prolific, a cap, fine flavor and rather soft.

Marlboro; a fine early red, not as hardy as Turners, season the same; suckers badly, fruit very large, fine flavor and fine color.

BUSINESS MANAGEMENT IN SMALL FRUITS.

M. A. THAYER, SPARTA, WIS.

Mr. President Ladies and Gentlemen:—The success or failure in growing small fruits for profit, in these days of close competition and distant markets, depends almost entirely on the business methods employed.

Great success in banking is attained only by exact business methods and absolute accuracy in all accounts.

The merchant succeeds best, who knows the wants of his customers and the most attractive way of displaying his goods.

The manufacturer's success is found in producing the largest amount of best goods, at the lowest cost.

The commercial man's study is to distribute products to the best advantage, and reduce rates on his shipments.

In the management of small fruits, you should possess the accuracy of the successful banker, the tact of the prosperous merchant, the close economy of the thrifty manufacturer, the courage and energy of the commercial man. Yes, more. You should have a love and respect for the business; you should appreciate the dignity of labor; you should feel that

there is no more honorable calling than that of tilling the soil. You should take a just pride in standing at the door of nature's great storehouse, to hand out these forms of health and beauty.

The first requisite in a successful fruit-growing community is the formation of a society which shall include and unite all in this line, and induce them to work for mutual good.

The meeting of its members should be frequent, with a free interchange of ideas, opinions and experiences.

The society should be supplied with horticultural books, papers and reports for general circulation among its members.

All purchases of books, papers, plants, boxes, etc. should be by the society, thus saving much in freight, commissions and other expense.

The varieties grown, the packages used, and the manner of growing, trimming, picking and packing should be as uniform as possible.

The sale and distribution of all products by an authorized agent of the society would save much time, trouble and expense. My own society in Sparta is doing much of its work in this manner.

IN LAYING OUT A PLANTATION

the rows should run the longest way of the land (north and south preferred), and if fields are large, cross alleys should be made every ten or twelve rods for convenience in manuring, mulching, trimming, gathering, etc.

In growing small fruits I make no iron-clad rules to govern in all minor details.

The selection of a location, the quality of the soil, the varieties to set, the manner of cultivation, trimming, mulching and many other things must be determined very largely by circumstances and your own good judgment.

There are, however, certain essentials which cannot under any circumstances be omitted without great loss, if not positive failure.

The ground must be rich and well prepared.

The plants must be vigorous, hardy and suited to your wants.

The roots must be well spread in setting, and the earth firm about them.

Cultivation must be frequent, and weeds must not be allowed to grow.

A heavy mulch of green clover cut in the blossom will hold moisture, prevent weeds from growing, fertilize the soil and keep the berries clean.

Winter protection for most small fruits is an absolute necessity in this northern climate.

Follow these suggestions in the main, and by close attention and good judgment in pinching back, trimming, wiring, etc., you are pretty sure of a good crop.

PICKING, PACKING AND MARKETING.

Now comes picking, packing and marketing; important factors in the growing of small fruit profitably, and they often determine the success or failure of the business.

To small growers with a near market it is not so important, but with large productions and long shipments it is necessary to adopt thorough business methods, and maintain strict discipline in every department. Especially is this so in the management of pickers working by the

box—many of them without experience or judgment, often damaging the sale of fruit several times the value of their labor.

A person who will not pick fruit clean from the vine, clean in the box, without bruising and without stain or dirt should be discharged at once.

If fruit growers would in the beginning insist on thorough systematic work, pickers would soon become educated to do their work well, and many dollars thus be saved.

There are various methods of keeping accounts with pickers. In ordinary plantations tickets representing the number of boxes are given as the boxes are brought in; others adopt the plan of a card representing 100 or 500 boxes, punching out to correspond with the number of boxes filled.

Uniform prices, as far as possible, should be paid to pickers, and one thing bear in mind, large fruit can be picked for one cent per quart, easier than inferior fruit at one and one-half or two cents.

Therefore, good varieties in good soil, well trimmed and cultivated, will save you money in picking.

I will give you my method of managing pickers, which has proved very satisfactory.

A person wishing to pick signs the following agreement:

"THAYER FRUIT FARM.

SPARTA, WIS.

All persons employed to pick berries must conform to the following

RULES AND REGULATIONS.

The boxes must be free from stain and contain no leaves, stems or dirt.

All ripe fruit must be picked clean from the vines.

Green, imperfect or soft fruit must not be put in the box.

All fruit must be picked carefully without jam or bruise in any way.

Fruit must not be picked when wet with rain.

Fruit must not be allowed to stand in the sun.

PRICES:

One cent per box, payable in tickets, to be redeemed when presented in sums of even dollars.

One dollar extra premium will be paid every person picking 1,000 boxes under above rules.

I hereby make application to pick berries, and if accepted will conform to all Rules and Regulations, and will give at least three days' notice before quitting the job.

Dated, Sparta, Wis.,.....

..... "

This application if approved is placed on file and numbered with name of applicant.

Tin cases holding a single quart box are provided each picker and strapped around the waist, leaving both hands free. A wooden case or carrier holding six boxes is also provided for each picker, and all cases are numbered to correspond with number of applicant. When ready for business all pickers, having their own numbered cases and carriers, are formed in military lines of twos, the order "forward march" is given, and all are marched to their work.

As the rows of fruit are reached each couple takes a row, one on each side. When the six-box carrier is filled the picker calls his or her number, "52" or "56," as the case may be. One of the men in attendance takes the case, delivers at packing room, fills with new boxes, and returns with check for the amount, providing the work has been well done.

These checks are all numbered and bound in books, and like bank checks are used but once. They cost but ten cents per thousand boxes, and being numbered we can tell every day, or any day in the season, how many boxes have been picked, and as boxes brought in must agree with checks issued, neither picker nor attendant can deceive you. Each picker having a recorded number, and this same number being on the carriers brought in for examination and packing, you can always tell who is doing good work, and who not; returning word to the careless picker, "boxes must be filled better," "too many green berries," etc., etc.

PACKING FRUIT

is comparatively easy, provided the picking has been well done, and the packer is himself honest. The fruit grower must be prepared to handle his fruit promptly, and know just what to do with it. All boxes and cases must be prepared beforehand, and help engaged, for there should be no delay. Your boxes and cases should be well made, clean and neat, without stain or dirt. By all means use a stapling machine for making the boxes, instead of tacks. It is much cheaper and better. Let your boxes be well filled, and don't put poor fruit in the bottom. Select out all imperfect, soft or green fruit and throw it away. Always give good, honest measure, and a uniform quality throughout the box. Whether prices be high or low, the purchaser rich or poor, make it a rule never to market poor fruit, and your reputation in a few seasons will be worth many times the value of all poor fruit lost.

FRUIT FOR LONG SHIPMENT

should be picked before fully ripe, and not when wet with rain. If the weather is hot, leave in a cool place for some time before packing in cases and shipping. Cases should be neatly directed on both ends, and your own stencil on the sides. Having long shipments to market, it is imperative that only such varieties be grown as will reach their destination in good order. Ship fruit on commission only to responsible parties in large cities; ship to small places only on regular orders and at agreed prices. Having found a good house, ship to no other in that city. It is important that every fruit grower should thoroughly understand the following facts:

That choice fruit is always in demand at good prices, and the market never overstocked.

That poor fruit never sells well, brings low prices, and the market is easily overstocked.

That it costs as much to raise poor fruit; that it costs more to pick poor fruit; that it costs as much to box and case poor fruit; that freight and express charges are just as high on poor fruit; and when sold it is after good fruit is gone, and then at half price.

This being the case, the intelligent fruit grower will understand, at once, that in selecting varieties, in choosing locations, in preparing the soil, in selecting the plants, in hoeing, in mulching, in trimming, in picking and in packing he is performing an important part in the business management of small fruits.

DISCUSSION.

Mr. E. J. Cutts: Do you use that box you spoke of for strawberries?

Mr. Thayer: It is not so convenient for strawberries, because it is apt to tip up. We have had some discussion here on the question of boxes in which to ship our fruit. Now, the wine measure quart box contains 57¾ cubic inches, and the dry measure quart contains 67⅕ cubic inches. We use a box that is called the scant quart. This one that I show you is one of them. Now, you take that box level full and it holds 60 ⅛ths cubic inches; more than the wine measure and less than the dry measure quart. If you will notice you will see that it is a different shaped box from that generally used. I have it made especially for my use. It is broader and not so deep as the ordinary box, and I think this is an advantage. Now, I take that box, and instead of making it just even full, I take and round it up a little, so that when it reaches the market it will be a little more than even full, and I am assured by dealers all over the country who have used them, that it gives very much better satisfaction than the old way. By this method of filling, you get a full quart in the box as it leaves the farm. We know it because we have tried it many times.

(The box described by Mr. Thayer was here examined by different members of the society.)

Mr. Hamilton: I have sometimes thought that it would be a good plan to put the names of the varieties of our berries on the cases that we ship them in. I would like to hear from Mr. Thayer on that subject.

Mr. Thayer: As an educational measure I think it would be a very good thing. I have investigated the subject somewhat by diligent inquiry among commission houses in Chicago, Minneapolis and St. Paul, and the commission merchants do not seem to think that it makes much difference. They say that there is not one buyer in a hundred that ever knows or cares what the variety is. Still, I believe it would be a good plan to put the name of the berry on each box as suggested by Mr. Hamilton, and I think the public would soon become educated to understand the different varieties of berries in the same manner that they now understand the different varieties of apples. And in time they would want to know the name of the fruit they buy, as well as they now do the names of many other things they purchase. I see no reason why it is not just as important in the

fruit business to designate the smaller fruits by name, as it is the larger ones.

Vice-President Wedge: What variety of strawberries do you prefer?

Mr. Thayer: In my opinion the Warfield No. 2 is the best berry.

A member: Name the five best varieties for market purposes?

Mr. Thayer: Well, to start with, I will tell you that you are asking a good deal. Situated as I am in Wisconsin, with no home market, my aim is to select the berry which is nice looking and firm. That is the berry that gets there in good condition, and takes the public eye. That is why I believe in the Warfield as being the best berry for shipping to a far market. I have used the Jessie as a pollenizer, but its shipping qualities are not so good, unless it is shipped before it turns red very much. For near markets there are the Bubach and Haverland. The Crescent is an old standard for near market, and I have found it a good berry. If I were to select for myself I would take the Warfield, Jessie, Bubach and Haverland, and like everybody else I am skirmishing around to find a good pollenizer. We have a fine pollenizer in Michel's Early. I am quite well pleased with the Sandoval. I think that makes a very good combination when used with the Warfield. I have tried the Candia, and it does pretty well. While the quality of the berry and its yield are not satisfactory, still, it gives us a few at the last of the season, that are very attractive and nice. I have found it hard to get a staminate variety that is as prolific as the pistillate.

Mr. Cutts: How do you find the Bubach for market?

Mr. Thayer: The Bubach is a very nice berry for market.

Mr. Barrett: Have you ever observed any difference in the hardiness of the staminate and pistillate varieties?

Mr. Thayer: That is one great advantage of the Warfield, and one great objection to the Jessie. It is not so much in the flower itself as in the way it grows. The Jessie gives us a large, beautiful flower, standing clear above the foliage, and it is just in time to catch any frost that comes along. The Warfield, on the contrary, has a little delicate blossom that hides under the foliage and is protected by it from the frost.

Mr. Keel: It is just about like the Crescent in that respect.

Mr. Brackett: What do you use for covering in the winter for your strawberries?

Mr. Thayer: Well, I have used various things. I am now using rye straw because it is easier for me to get. I used pine boughs one year quite successfully, and I remember it made a very nice covering. I have also used marsh hay and cornstalks.

Mr. Ludlow: I have been very successful in using cornstalks. One winter I used coarse hay there was no foul seed in. That winter there was a great deal of ice and snow and sleet, and it formed on this matted hay and seemed to smother everything under it. That same year I had a portion of the patch covered with cornstalks. Those that were covered with the cornstalks came through all right, but the others suffered very much.

Mr. Thayer: Of course it is hard for us to tell just the condition under which fruit will and will not succeed. For instance, last season we had a remarkable thaw early in March, and it flooded nearly half an acre of my strawberries. Then it turned off cold, and they were covered with ice six or eight inches thick, solidly frozen, and I supposed, of course, that I should lose all my fruit that was under that ice, but it made no difference whatever. Now, I had the same experience with raspberries and blackberries, but with them it turned out the other way—it killed them.

Dr. Frisselle: Do you cover raspberries entirely with dirt, or do you use hay or straw?

Mr. Thayer: There is where you get the benefit of mulching. If you use the hay, it packs down, and in the fall of the year it lays like a mat, close together. Now, as you bend your canes over, you can take that, and with about one third of the dirt usually required you can cover them very nicely. I consider it a great assistance. This past season our clover was a failure, and this year I bought a large amount of straw. I shall mulch with that next season, and use it in the same way in covering.

Vice-President Wedge: Supposing that a person did not have the clover, what could he afford to pay for it, and cut it and haul it?

Mr. Thayer: Well, I have had just that experience, and I paid $6.00 an acre for it. I cut it myself and hauled it, but I will say that it was adjoining my own plantation.

A Member: Was it the first or second crop you cut?

Mr. Thayer: That was the first crop when it was in blossom. That seems to me to be just about the right time. By putting

that on and cultivating between the rows, it keeps the blackberry root in just the right condition.

Mr. Curtis: How about planting your berries an equal distance apart each way and cultivating them both ways—does that pay you?

Mr. Thayer: No, I do not think it does. It requires too much ground and is too expensive in supporting them. I prefer to plant in rows near together. My raspberries are planted two and a half feet apart, and my blackberries three feet apart. Then they are supported on each side by wires. I believe I have stated that my plantation is about eighty rods long, and every twelve rods I have a ten foot alley, and at the end of each row I put a post to which my wires are attached. These wires rest on nails driven into stakes placed between the posts, and it keeps them up in close compact form for mulching, harrowing, cultivating and picking. You see, they are all up out of the way.

Mrs. Kennedy: How high do you put the stakes?

Mr. Thayer: My stakes are usually five feet long. I drive nails in them according to the height of the plants in that particular row. Some canes will be two or three feet high, and some only a foot or two high. When wired on each side, it keeps them up in shape, and we can work under them and get under them and dig very nicely in that way. I use a post at each end of the row. My rows are twelve or thirteen rods long, and between these posts I use nine stakes, four on the west side and five on the east side, in which nails are driven. The wires rest on these nails.

Mr. Sampson: Will it make any difference at which end you commence to lay those plants down?

Mr. Thayer: It is very necessary that you commence at the north. We always commence at the north end of the row, and move the dirt from the north side. I have a four-tined fork which I made by taking an ordinary fork and removing the two center tines, and one of my men takes this fork and places it down near the base and raises it up, and thus gathers all the laterals in together, while another man with a spading fork inserted right near the root turns it over with very little breakage. In seasons where it is as dry as we had this year, I think this way is a decided improvement.

A member: Do you turn the first hill to the north and then lay the next one on top of that?

Mr. Thayer: Yes, turn the first to the north and lay the next three feet further, lay it just to the west of the preceding hill, so that the top of this hill will protect in a measure the other from the west, and so on in succession.

Mr. Harris: What is your object in laying to the north every time?

Mr. Thayer: Well, you see, Hamilton is my great grandfather in the berry business, and he told me that in laying them to the north you derive this advantage; when you come to raise them in the spring they will not come up straight, they will be a little inclined, and the new bush, coming up straight, the old bush leaning over it shades it partially from the southern or direct rays of the sun. This way of laying them is also more convenient in picking.

Mr. Hamilton: I have advocated this laying to the north, and believe it to be the best way yet discovered. Last year one of my neighbors commenced on the north end of his row and laid it down. When he got to the south end, instead of walking back to the end of the row, he commenced where he was, and laid the next row to the south, thus laying one row to the north and the other to the south. And so he went along, and when he had completed his task they laid in both ways. When they came to bear there was a marked difference in the appearance of the fruit during the entire season. Those that lay to the south were facing the sun—they were exposed to the broiling hot sun—and consequently there were many berries injured from the excessive heat of the sun. They had to contend also with the failure of the growth of the new wood to protect them, either north or south, so there was a marked difference between those that laid to the north and the ones that laid to the south.

Mr. Thayer: The secret of laying a blackberry or raspberry down successfully is to bend it below the dirt line and not above. You must do the bending in the root.

Mr. Brackett: When do you pinch your blackberries?

Mr. Thayer: I pinched the most of them this year when they were ten inches high. Heretofore I have usually let them go until they were fifteen or eighteen inches high, but this year, as I said, I pinched them when they were about ten inches high. Two years ago we had a severe frost when the new shoots were up perhaps six or eight inches high, and it cut those new shoots right off. They wilted down and left mere stubs. Well, those stubs threw out new branches, and the best

canes we ever had were grown from those branches nipped by the frost. This year I have experimented in that way and have nipped the most of them low down, and I have never had so fine a growth of canes in my life.

Mr. Ludlow: Do you take out the surplus canes?

Mr. Thayer: Yes, of all kinds. I remove them just as soon as I can get at them. I take a pruning knife and cut out all the surplus canes.

Mr. Cutts: What we call the suckers?

Mr. Thayer: Yes, I treat them as weeds, and hoe very thoroughly.

Mr. Sampson: How long do you advise keeping a blackberry patch?

Mr. Thayer: Well, I think twenty or thirty years would be sufficiently long. In regard to the time a blackberry plantation will last—when I was down visiting my friend, Mr. Hamilton, two years ago, he took me down to a certain plantation and said, "this is the twentieth crop that has grown on that patch of blackberries."

A member: What kind of blackberries do you grow?

Mr. Thayer: The Briton for the main crop with a few Snyders to start with. I aim to grow varieties that will make a continual season from my first early strawberries to my last late blackberries, for I calculate to keep the customers that I have well supplied with fruit from the opening to the closing of the season.

Vice-President Wedge: Is the Snyder productive on sandy, light soil?

Mr. Thayer: Well, with good culture, it produces with me from one hundred to one hundred and twenty-five bushels per acre, while the Briton has produced—well, my own average has been about 150 bushels to the acre. I have some acres that will produce about 200 bushels.

A Member: Have you ever tried the Lawton or the Wilson or the so-called Erie?

Mr. Thayer: I tried the Lawton some years ago, when I was in the berry business for fun, but they did not do well with me.

Mr. Harris: Truman M. Smith, one of our best members, adopted a system twenty five years ago by which he was able to get much more per box for his fruit than any of his competitors. His idea was to sell nothing but first-class fruit, and in every box he put a little card, and it said on that card, "Grown and picked by Truman M. Smith," giving his address, and that

went out on every box. But he was sharp enough not to put his name on the crate or box that they went out in. I see that he has adopted the same practice with his oranges, and I have no doubt but that his oranges will sell higher than the ordinary orange, solely on account of that one thing.

[Read at Summer Meeting]

SMALL FRUIT INTERESTS.

C. L. SMITH, MINNEAPOLIS.

Your worthy president has asked me to say something about small fruit at this time. I suppose he expected something new, but I can hardly hope or expect to say anything that will be new to this gathering of veterans. The most any of us can do is to rake up some old truth, dress it in the latest style, and call it new, until some cruel critic lifts the veil and shows us an old familiar face. Now, please do not imagine that I think for a moment that any member of this society or the whole of us put together know all that is to be known about even the smallest fruit. We are all learners day by day. We know more than we did last year. Some of us also are painfully aware of the fact that there were a great many things we did not know even last April.

If we had known that from the last week in April until June 1st, we must do without rain, many of us would have done less planting, and more mulching, raking and watering.

Three years of drouth has set us all studying how to conserve moisture, and now, just as we seem to have solved some of these dry weather problems, it begins to rain and we turn to the study of drainage; we skip the articles on "Dust Blanket," "Surface Cultivation," "Mulching" and "New Agriculture," for "Levels," "Ditching Machines" and tile advertisements.

Among the lessons of the year there have been some things more clearly fixed in my mind than others, and I would like to call the attention of this society to a few of these.

Currants, gooseberries, raspberries and strawberries can be grown anywhere in our state, and yet comparatively few families have a supply sufficient for the wants of the family, either in the village garden or on the farm. Every family ought to have them, every owner of a farm or garden ought to know how to grow them, but they do not; many are doubtful, others negligent and careless, some are going to next year, while many say it cannot be done. It should be our mission as a society to preach the gospel of small fruit, until we have converted every man, woman and child in the state. How can we do it? I had hoped the much talked of "Primer of Horticulture" would have been spreading the truth as we see it before this, but it does not seem to materialize.

We need to keep saying some things over and over all the time. They are old to us, but new to some one else. Pistillate varieties will not fruit

when planted alone. Oh, but we have said it a thousand times, it is printed in all the reports, repeated a dozen times each year in all the farm papers, and yet each year hundreds of expectant lovers of the luscious berry, who have planted and cultivated by the book, see fond hopes and prospects wrecked, their faith, patience, time and money all gone, just for the sake of a few perfect flowering plants scattered along the rows, and when the mistake is pointed out they exclaim: "Oh, yes, I had heard that, but did not think."

If we could utterly annihilate all but three or four of our best varieties, we could double the production of berries in the state. Three years on the dry prairie summer fallowing, is the best preparation for strawberry planting. Mulching between the rows with fresh cut slough grass in August is the best check against drouth. The earlier the plants are set in the spring the better.

Cutting out the old canes of raspberries as soon as the fruit is gathered seems to be of great benefit to the new canes. Pinching the new canes as soon as they are three feet high seems to produce better results than allowing them to grow unchecked. Red raspberry plants from new plantations give better results than those from the older ones. The Houghton Seedling gooseberry seems to lead all others and is productive on a larger variety of soils and under more varied conditions than any other sort. The Red Dutch currant, kept free from weeds and grass, with old wood cut out and plenty of manure on top of the ground, seems to be good enough for the average planter.

In closing I wish to ask some questions for some one to answer, if they can, and for all of us to think about.

As about ninety-five per cent of all the strawberries in our markets are Crescent and Wilson, and everybody seems glad to get them, what sense is there in wasting time, money and faith on something supposed to be better, until everyone is supplied with these?

Is this society ready to recommend the Jessie strawberry for general cultivation?

How and when should black raspberry tips be dug, handled and planted to secure the best results?

How can we best enforce the truth that for the farmer who wants berries the old, well-tried sorts, sold for a reasonable price, are the kind to buy and plant, rather than the new and wonderful, just discovered, owned and controlled exclusively by one firm or individual?

After 20 years' experience in Minnesota I believe the sale of new varieties has done more to dampen the interest in small fruit culture than frost, drouth and blizzards combined.

(This paper gave rise to an interesting discussion and brought out the important fact, that dry weather with hot sunshine at the time of blossoming interferes with fertilization.)

VEGETABLES.

SUGAR BEETS IN MINNESOTA.

PROF. W. M. HAYS, FARGO, N. D.

The experiment station has clearly demonstrated that sugar beets, with a high percentage of sugar, can be grown in Minnesota. The sugar beets of to-day are highly bred sorts that have been perfected in Germany and France, where by selection the per cent. of sugar of the common beet has been raised to more than double its former amount of six per cent. This seed will produce quite as good sugar beets on Minnesota soil, and with Minnesota sunshine, as it will in Germany, sunny France, or in Nebraska, where considerable sugar is now made. In fact, our results show exceptionally high. While our soils will produce beets of superior quality, they also produce large crops. Twelve or fifteen tons per acre should be a fair average. As the seed can be purchased cheaply, the labor be partly done by horse implements, and as rents of rich land is very low, we should be able to grow and market beets, where the haul is not over five miles, at $2.75 to $3.50 per ton on an average. Of course, where we put so much expense in labor and seed per acre the chance for loss is considerable, as in a very unfavorable year, there is a chance to lose $25 or even more per acre.

The paramount question now is, shall factories be built? Some one says to me: Would you like to take stock in a company and help erect a factory at Owatonna, Stillwater, Lake City or other point, where the farmers have left wheat and are experienced in general farming, and with assurance of $4 per ton for their beets would grow them? Under good management I believe it would be a safe investment. There would be at the start two disadvantages. The newness of the business to the farmers would doubtless result in some poor, coarse beets and in some discouraging yields. The newness of the locality to manufacturers would result in some troubles. The short season between pulling time and when it is too cold to handle beets out-doors would require some modification of the ordinary beet buildings. Allowing them to freeze in the piles in the field and then hauling on the snow like stove-wood, might work where fuel is very cheap. The freezing would not necessarily interfere with getting out the sugar, as it would be perfectly preserved until the roots were thawed. Storing the roots in buildings that would not allow them to freeze, thus extending the operation of the factory over several months, could be done but would be expensive. The farmers would very soon learn to raise good beets, and doubtless economical arrangements could be made for saving the beets so as to run the factory far into the winter.

As horticulturists you are especially interested in the methods of planting, cultivating and harvesting the beet. What is wanted is medium

sized beets, of perfect form, no fingers and toes, grown entirely under ground, solid, compact, with a high percentage of sucrose and a small percentage of other solids in the sap, which are separated with difficulty from the sugar in the processes of refining. Good yields are wanted, but not too much at the expense of per cent and purity of sugar in the juice. A large yield of sugar per acre in large, coarse beets is often nearly worthless on account of the materials which must be gotten rid of in extracting the sugar.

Value per acre of beets depends upon the amount of sugar grown and the cost in manufacturing it, and not alone upon the tons of beets brought in the farmer's wagons. As the better butter and cheese factories now all pay for milk on its analysis, so beet factories pay for beets on chemical analysis.

To grow the most value per acre, the following general plan is recommended:

Choose any good corn land that is of such a texture that natural downward drainage or percolation is easy and complete. Too light a soil, as one largely of sand, is not best, as it is too much liable to drouth. Likewise a stiff clay is too cold, may be too wet, and is too hard for the easy penetration and development of the roots, and on this land cultivation is too difficult and expensive with beets. The prairie loam, the timber soil made up of a happy mixture of clay, sand and humus, in fact most of our immense amount of rich soils, exactly suit the beet. Just as the education of the boy should begin by educating his parents, so the preparation of the soil for beets must be begun in growing the previous crops. *It will not pay to grow beets on weedy soil.* It simply costs too much in weeding. As sugar beets are nearly certain to grow too large and coarse if placed on freshly manured lands, two crops of corn or other hoed crops in which not a single weed is allowed to seed, should be grown on our rich lands between the manuring and beet crop. They can then be raised without so much expense, and will have fair size with excellent form and quality. Fall plowing may pay in some cases, but as a rule I should plow only once and that in the spring, following at once with the drag or some better surface pulverizer. As the plowing should be done nearly or quite ten inches deep, less raw subsoil will have to be turned up if the plowing for the previous crop has been nearly that deep.

The land should be put in fine condition at the surface. The seed should be planted at corn planting time or even a little earlier. Twenty pounds per acre should be planted with a hand drill, Mathews is good, or with a horse planter, where obtainable. The rows should be eighteen inches apart, with the intention of using hand wheel-hoes in cultivating. Thick planting results in more value per acre, as there is then a large yield of medium sized beets. Planting in rows twenty-four inches apart, with a view to cultivating between the rows with a horse hoe, will suit many farmers as they can afford to give the one-third more land and the slight difference in the quality of the beets for the chance to substitute horse for man power. The seeds should be covered about three-fourths of an inch, and with a horse machine we found care necessary that the press wheels do not go too deeply in the soft land. The cultivation should begin very early, and the first work is best done by the hand wheel-hoe run very close to either side of the newly appeared plants. If the ground

is made very fine and smooth, and the planter run straight and at an even depth, so that the plants come up uniformly, half the battle can be won at the first and second hoeing. The middles between the rows must be looked after sharply at a very early date, and the time of hand weeding in the rows should not be left too long.

These earliest cultivations are very expensive if left until the weeds have the field, besides the crop should have the advantage at this time of as strong a solution of plant food as the soil can furnish, with no weeds to be using it. Beets are not unlike pigs, and stunting them early has a retarding effect on their future developement. When the beets are three to five inches high they should be thinned to six inches apart in the row. The narrow onion hoe is of some assistance but part of the work must be done by hand. There is a temptation to leave weeding in the row until the final thinning out, but I think it best to weed the rows and partly thin early and complete the thinning later. The cultivation should be complete as to the removal of weeds and making a fairly thick dust blanket until the leaves well cover the ground. Care should be exercised to not disturb the main roots, and there is no objection to hilling an inch or so.

The beets reach their best at the time when there is the highest percentage of sugar in the sap, and then slowly deteriorate if allowed to remain in the ground. The sucrose turns to other less valuable forms of sugar, and the plant starts a new growth. There are several ways of telling when to pull the beets. By keeping watch the leaves will be observed to change to a slightly yellowish green, the lower leaves will begin to droop and turn yellow and small new leaves will begin to start from the crowns of some plants. If left a little too long new, white, tender roots will be found starting from either side down along the main root.

When ripe, the common stirring plow should be run alongside of the row within an inch or so of the beets, and men following should pull the loosened beets out and toss them into piles. Here they can be topped—a common butcher knife is best—and carried into piles of twenty bushels, more or less. These piles can be made in round pits a foot or less in depth, covered with cheap hay or straw and then with six inches of dirt; a wisp of hay placed in the top serves as a ventilating flue. Here the beets keep perfectly until cold enough to freeze them, and if they could be handled and manufactured after being frozen solid, here would be a good place to prevent thawing and freezing until ready to be used.

Minnesota soil, climate, timber, mines and other natural advantages has resulted in much accumulation of capital. Enough of this to thoroughly try manufacturing beet sugar should be directed into building one or more factories at an early day. With the present county; and state's willingness to help, I have strong hopes that the test will be made on a large and practical plan, and next year is the time to make it.

SUGAR BEET.

(A DISCUSSION.)

Mr. Wm. Danforth: I have a report from three growers, who received some of the seeds of the sugar beet that were distributed by the Agricultural College. I understand that Mr. Phinney has made a test with the following result: Three hundred and fifty-six pounds of sugar to two thousand pounds of beets. As nearly as we can estimate it, there were twenty-one tons of beets to the acre. The ground on which the beets were grown was pasture ground, broken up and gotten into condition in order to test the seeds and get the best result. The ground was very rich, and these seeds were sown in rows about eighteen inches apart and well cared for. Mr. C. A. Sargent, had two hundred and seventy-two pounds, and I got two hundred and forty pounds of sugar for every two thousand pounds of beets. The soil on which I planted them was sandy, and had been cultivated for twenty or twenty-five years. It is the very poorest ground I have. We have therefore tried both extremes of soil. Now, if we can get people enough interested in raising them to insure a sufficient quantity for manufacturing, there will be no trouble in establishing a manufactory. We ought to bring this matter before the people as soon as possible, so that, if it proves practicable, we can procure the necessary establishment, and raise and manufacture our own sugar. Everybody says that sugar is too cheap to raise, and that we don't know what our government will do, but in all events we ought to get this information before the people, and thoroughly understand it ourselves, so that, if there is anything to be made out of it, we can carry it on ourselves.

President Underwood: Will it pay the producer to raise the beets?

Mr. Danforth: Well, I think I can raise beets as cheaply as I can corn.

Mr. Sampson: How many pounds of sugar will a ton of beets make?

Mr. Danforth: You can make 350 pounds of sugar from a ton of beets.

Dr. Frisselle: What do they get a ton for the beets?

Mr. Danforth: They brought $3.50 a ton last year in Nebraska, and the California factory paid from $3.50 to $4.50.

Prof. Green: I have watched and studied this question with a great deal of interest. When I entered the Agricultural College in 1875, they were then talking of raising sugar beets in Massachusetts, just the same as we are to-day. One of the professors had made sugar in the laboratory and had proved that the beets in Massachusetts were just as rich in sugar as the beets in Germany. We imported a lot of German machinery and built a factory at Franklin, Mass., and another at Portland, Maine, and several others. They paid $4.50 a ton, and I think some of them paid $5.00. The farmers started in to raise them, thinking they could make money at that price, but they were unable to do so. The factories were obliged to close their doors because beets could not be raised cheaply enough. I am afraid that will be our experience. When you come to sow the seed and to thin it out and weed it—the first weeding is always an expensive matter—and pick the beets and select them—for the sugar beet is of no use for sugar unless it grows below the ground, and is less than three pounds in weight—you will find it a pretty costly undertaking. Then they must be carried to the mill and all that, and, at the price they offer for them to-day, I do not believe there will be any money in them. I do not believe that you can raise beets in this state for $3.50 a ton.

Mrs. Bonniwell: I think it pays to raise sugar beets to feed our dairy stock.

Mr. Cutler: I think it is thoroughly impracticable for us to engage in beet sugar culture in this state, with our present methods of farming. Even now it is almost impossible to secure laborers to harvest our crops. Even with the amount of machinery that we have to cultivate and manage our farms with, we have found it almost impossible to secure help enough. You all recall the experience of the farmers in Dakota this fall. With the present high cost of labor, I believe it to be impracticable to pursue the system of cultivation needed to produce the sugar beet, a system of intense cultivation that requires much hand labor. Labor is very cheap in Germany. It might be possible in the Southern states, where labor can be secured for 25 to 50 cents a day, to successfully engage in this industry; also in California, where they have Chinese labor. It is my belief that our sugar will be raised in those countries where labor is very much cheaper and in a more degraded condition than with us.

Mr. Danforth: I think the beet itself is a profitable root to raise, as the pulp is good to feed our stock.

A member: Can the beets be started in beds and then be transplanted to save seed?

Mr. Smith: I don't think it can profitably on account of the labor costing more than the seed.

Prof. Green: The pulp is used a good deal in Germany to feed cattle. We have so much cheap fodder here that it would not be worth much for that purpose.

CELERY GROWING IN MARSH LAND.

J. A. SAMPSON, EXCELSIOR.

Mr. President, Ladies and Gentlemen:

I have been requested to furnish you an article on "Celery Growing in Marsh Lands."

> Man to do good service is scarcely fit,
> Unless supplied with plenty of grit,
> But celery of the very best is found
> Where grit itself does not abound.

You cannot learn to be a farmer by books alone. You must have experience and perseverance as well as all the information you can get, ere you will make a success.

I will say that I have been pleased with my success in celery growing, my celery taking the lead in the Minneapolis markets, having received many compliments as to its quality. My motto is, "What is worth doing, is worth doing well," and always to try and do a little better.

My choice of soil is a marsh containing about two feet of peat, well drained. I prefer tile to open ditch. I think a small marsh is richer in plant food than a large one, on account of the wash from the surrounding hills. I use dressing on my celery marsh to keep it up and, if possible, to make it better.

I have been in the habit of planting in trenches; I intend to try surface planting, and put the rows further apart, so that I can cultivate without covering up my celery. Four feet apart has been the distance, and if I plant on the surface it will require more space, in order to bank up the celery.

The advantages to be obtained in marsh land, if *well drained*, are: First, the handling of the ground, both in banking and also in the taking up of the celery. Peat is much lighter than loam. Second, it holds moisture better, being of a spongy nature, and celery needs moist ground. Third, you can work on it after rains in setting out plants much better than you can on upland, or in other words, when upland is muddy and sticky the marsh is like a carpet, simply dampened, the water being all absorbed by the soil. Fourth, peat is better to trench celery in for winter, keeping out the frost much better than ordinary loam. Fifth, it does not contain as much

sand. A little sand in a celery stalk makes it unpleasant to eat, no matmatter how choice the celery.

Now, fellow citizens, I presume you are most interested in the question, does it pay to grow celery for the market? I will say that it has paid me, on an average. The business is very apt to be overdone, the same as any other branch of industry. In such a case, only those who are best situated, using all the advantages to be obtained, will make it pay.

How to grow the plants. First, select the variety of seed you want; soak it about three weeks in water, then drain off the water and mix dry earth with the seed in order to separate it, and sow it in a hot-bed or place prepared for it, being careful not to plant it too thickly. Then sprinkle a little fine dirt over the seed and give it a good wetting. Now keep the bed moist for two or three weeks until the celery comes up. When large enough to handle, transplant, setting it about three inches apart. The plants will now, if properly cared for, soon grow large enough to plant in the trench or field where it is to be grown.

Mr. Harris: Did I understand you to say that you soaked the seed three weeks before you planted it?

Mr. Sampson: Yes sir, that is the way that I did.

A member: How did you bleach it?

Mr. Sampson: By banking. There are several varieties that bleach without banking. But the color does not improve the eating qualities. It is simply a matter of opinion.

Dr. Frisselle: What causes the celery to rust?

Mr. Sampson: The heat, largely. It rusts more in hot weather, and as the weather becomes cooler the rust is less noticeable.

Prof. Green: What theory do you work on in banking?

Mr. Sampson: Well, those who have studied celery raising know that it must be banked in order to make a nice color and juicy celery. This is done by pressing the earth up around the stalks.

Mr. Harris: Do you wet it?

Mr. Sampson: The earth itself contains sufficient moisture. You don't want it wet when you bank it. That would injure the celery by causing the dirt to stick to it. For an early celery, I like the Golden Heart celery. It is not quite so hardy for winter keeping, but it will bleach much quicker. The Crawford, during the hot weather, has a rather pungent flavor that is pretty hard to get rid of. Still, for many reasons, I consider the Half Dwarf Crawford a superior variety.

Prof. Green: Have you ever tried bleaching with straw and boards?

Mr. Sampson: I never tried straw except one season when the rows were planted a little close together. I then used hay

which I twisted into a rope and put alongside of the plants where the dirt would not stand up. I cannot say that it was any better than the dirt. I have also tried boards and tile. I thought I had found a plan that would be successful of putting the tile over each plant, but the hot sun striking down upon the tile created a warmth inside that killed the plants. The plan was worthless. I have found also that there does not seem to be ventilation enough, when you use boards, to make good celery.

Prof. Green: The straw is used a great deal because the flavor of the celery is better than when it is banked with soil.

Mr. Sampson: It is the nature of straw to hold moisture, and, consequently, it approaches closer to the soil than hay would.

Dr. Frisselle: Do you transplant your plants from the seed bed before putting in the trench?

Mr. Sampson: I have been obliged to transplant, under the circumstances, two or three times before I put them into the rows, but it is not always necessary. I first plant the seeds in the seed bed, because, of course, it would not pay to use a large surface of ground to get the little plants started.

Mr. Wilcox: Do you think that this straw would help to make up for the deficiency, in case you did not have the moist ground?

Mr. Sampson: I think I could highly recommend the straw. Of course, we all know that straw is a non-conductor of heat and cold, and that it also holds the moisture that is under it. It does not allow the moisture to be absorbed by the rays of the sun, so it would certainly be advantageous to the celery to have the straw there. I noticed in some celery that I left on upland ground where it had got dry, that the celery was more apt to be spongy. Of course, we have some spongy celery in the marsh land.

President Underwood: Where a person has not marsh land, I suppose you would advise planting celery on the richest and lowest land that he has.

Mr. Sampson: Yes. Celery requires a good deal of nutriment, which it draws from the ground. It is on the same principle as raising cabbage. You cannot get ground too rich for cabbage raising. No doubt you all know that the richer the ground is, the larger and better the cabbage will be. I believe that all gardeners agree with me there. It is the same with the celery. I think an analysis of the celery stalk will show that there is much nutriment in it.

A Member: Didn't I understand you to say that you did your bleaching out of doors?

Mr. Sampson: Yes, for winter. I stated in this paper that for putting the celery away for winter, the peat is better. Many of the articles have stated that it is better to trench the celery on the hillside and cover it up, because the water would not then stand in the rows. Now, the marsh being underdrained by tile, there is no danger of flooding. Any water that the soil itself will not absorb will run right off in this tile. All that I have to do is to make the trench right in the soil, and put the celery in there as solid as I can pack it. I then bank it up and cover it up for the winter, and there it does a large part of the bleaching for winter use. If it had been bleached when I put it in there, it would have been rotten by this time and unfit for market. I keep it out all winter, and I have to guard it from rotting or freezing. I have had varied experience in that line. I will relate my first experience, thinking it may be of benefit to some of the other members. Some years ago I got my seeds started and thought I was in a fair way to get some profit out of my labor. The land where I planted them was not marsh land, but it was low land where the water was not more than four or five feet below the surface of the ground. I put trenches there as they claim they should be placed, and set my plants in the trenches. It was, apparently, a favorable day for setting out plants, but later on the sun came out bright, and the heat wilted the celery, and it went under. Well, soon there came a little rain, and I tried it again in the same trenches. This time the plants did nicely, and I was quite proud of my success. Every thing went on well for about two weeks, and then a drenching shower came up. After the shower, when I went down to the celery trenches, I don't believe that in any of those rows, twenty rods long, there were a dozen plants left that were good for anything. At that time I became a little disgusted with celery growing. (Laughter.) I therefore wish to caution those members who are contemplating setting out celery, that they want to do so in such a way as to avoid any chance of washing out by the water running down the trenches. I have found in my planting in the marsh that it is possible to cultivate with a horse without covering up the plants in the trench. I have also heard of its being done elsewhere with success.

Dr. Frisselle: I would like to inquire if the celery growers

at Kalamazoo—they have a national reputation—plant their celery in trenches or on the surface?

Mr. Wilcox: I believe the old method was to plant in quite deep trenches, but modern growers are making the trenches quite shallow. I am not prepared to say just how deep the trenches should be. I wish to call attention to one other matter in connection with celery growing. One of the difficulties of celery growing is encountered right at the start. The seed is very small and hard to germinate, which is a fact that a great many people do not properly appreciate. I was a little surprised at our friend Sampson recommending us to soak the seed two weeks. I never dared soak seeds that length of time. I saw a little device the other day that struck me as being just what farmers want for starting celery, tomatoes or other plants. It would be particularly well adapted to celery. Instead of starting them in a few old pans and boxes to carry around and make dirt in the sunniest windows of the house, just make a little box, say three feet long, eighteen inches wide and about one foot deep. Place slats down about four inches in the box, and on top of these slats place small boxes, common cigar boxes, with the dirt and the seed planted in them. Cover the whole box with a light or lights of glass set in a frame, and you have a miniature hotbed in which you can water the plants very readily. At the end of the box make a little door which you can open to secure the proper degree of warmth. Then just keep a few bricks or anything of that kind upon the stove, and open the door and lay two or three or four of the bricks in the bottom of the box. They will retain their heat a long time. I think this is the nicest plan I have ever seen for starting celery plants in the house.

A Member: Did you ever try hot water on celery plants?

Mr. Sampson: I never put any warmer water on them than I could bear my hand in comfortably. As my friend has brought up the hot water subject, I presume some of our members will feel interested in knowing that we use hot water on our pea seed where the weevil has got in them. We use it only to kill the weevil or some insect of that kind.

Dr. Frisselle: What time would you recommend sowing the seed in a hotbed?

Mr. Sampson: Regarding the time of sowing the seed, that must vary with one's ability to take care of the plants after the seed has come up. I have built a cheap greenhouse, which probably enables me to start a little earlier than the majority

of farmers. I intend to start my seed in the forepart of February. The celery plant is very slow to germinate, and is also a very slow growing plant after it has germinated until it attains some little size. I would not advise any one, with nothing but the ordinary means of growing, to start before the 1st of April, on account of the frosts. They will stand a little frost, however.

Dr. Frisselle: I think the point made by Mr. Wilcox is an excellent one. We know that the great difficulty is right at the beginning. It is in getting the seed to germinate. Now, if you have to spend three weeks in soaking your seed, and three more before they come up, it will be nearly fall before you get started. I have experimented some in celery growing. I have found a good way of planting in a hotbed is to sow the seed in rows, and lay down a board about six inches wide on the bed, and make a little trench or mark opposite to it. Sow the seed in this, and then lay another board on close to it, leaving not more than half an inch or an inch of space between them. In that way you will choke out all the weeds, and the celery will come up, all in a row. Another point which has not been sufficiently insisted upon is this: That celery is a swamp-growing plant, and will not grow well without water. It may be possible to grow it on upland, but it is a good deal more difficult. Undoubtedly the swamp or low land is the proper place to raise celery successfully.

Mr. Wilcox: While I second the statement of Dr. Frisselle and admit that it may be necessary when raising celery in a large way to have an abundance of water close to the surface, yet the most successful celery grower in Dakota county—who grows the most and best, and supplies our home markets entirely—not having this low land, commenced in a small way to grow it on high upland, which is very rich, and he has had admirable success. Still, I would not recommend anyone to plant celery on upland, if he has low moist ground.

Mr. Cutler: I have found it a good plan to cover such small seeds as celery with hay; have the ground moist, and then spread the hay over it and look at it occasionally.

Mr. Sampson: If you use the hay you cannot tell so readily whether the plants have come up or not, and if the plants should happen to come up under the hay they would be apt to have a long, slender stalk, and the sun would wilt them down.

Mr. Harris: While Mr. Sampson may be successful in soaking those seeds three weeks, I would not advise people who are

not used to growing seeds, to attempt to soak their seeds that length of time. He has a greenhouse, and can do this successfully, because of its even temperature, but in the farmhouse it is sometimes freezing cold, and sometimes very hot. My experience has been that, if the water in which the seed is soaked becomes fermented, the seeds are worthless.

Prof. Green: I sow the seed about the first of February, in a box in the greenhouse, and place the box where it will keep moist and be out of the way. I cover it with a little moss, which makes a cover that the celery seed will push through. When I sow celery seed, I don't push it into the ground, but prefer to cover it with moss or else protect it with something or other, like paper or cloth. If the plants come up too thickly in the box, just thin them out. Take a small soap box and cut it down until it is three or four inches deep. Nail a bottom on it, leaving three or four cracks in it for drainage. Then sow the seeds thickly in that, and afterwards thin it out. I do not use a hotbed, but have a cold-frame in which I put the plants about three inches apart in the row, with the tops sheared off; that makes them stocky. I should not want to start the celery as early as that for winter keeping, but for early fall celery the first of February is about right. It can be transplanted to the field about the middle of June, according to the weather. When I plant the second time, I always shear it off again. As the plants are set out, I put a handful of green grass over each plant. The advantage of this is, that, if you have to water them, this mulching will prevent the ground from packing down. Seed planted the first of February will make good fall celery that can be banked up with straw without any danger of its blighting or rusting. It will be fit to sell about the first of October.

Dr. Frisselle: In my neighborhood, I do not think that celery that is intended for winter keeping should be planted until after those tremendous spring rains which we always have in this country. I remember putting out 3,000 plants one season, and a few days after we had a very heavy rain. I don't think I had three plants left of the 3,000, that were not entirely buried.

Mr. Wedge: I would like to emphasize one point that has been made by Prof. Green, in regard to mulching the plants. I have used short grass and sometimes a little manure. It works well on celery or strawberry plants. This plan would

be especially applicable to the dry prairie regions of the state. I have found it very valuable.

Mr. Wilcox: I would like to have Prof. Green explain a little about his hotbed.

Prof. Green: Well, when you want to make a hot-bed do not wait until the spring that you wish to use it, but begin in the fall of the year. Now, I presume you all know about the frame and sash, &c., so I will begin with the bed itself. As I said before, begin in the fall of the year by keeping the soil covered, so that you will have no frozen soil in the hotbed. The best covering for such a purpose is horse manure, to which I always add some leaves or straw; otherwise the heat would be violent for a little while and then run down. Leaves are more satisfactory than straw. When I make the bed, I never use more than two feet of manure, and seldom over a foot. Still, if it was along this time of the year, I would not think two feet too much. If I wanted to start a lot of celery plants, I would start with a sash or two. These could be easily taken care of and transplanted in beds that could be made up later. I will say farther, that the manure should be heated before it is put in the bed. In putting it in the frame I pack it as hard as I can, especially around the edges; and sometimes I have even tramped it a little. The soil in the box is thrown out into a little pile and covered up with manure for a few days until I want to use it. I then put the soil back upon the manure. I use from four to six inches. When I plant lettuce I use four inches. I generally use leaves to keep the ground from freezing. My frame is of 2x10 inch plank. I cover it with litter and leaves in sufficient quantity to keep out the frosts.

Dr. Frisselle: Where will the farmer who lives on the prairie get his leaves?

Prof. Green: Well, let him use chaff, straw, manure or anything of that kind.

Mr. Sampson: I would ask Prof. Green if he could not suggest some way by which farmers who so desired could have hotbeds the coming spring. I do not prepare my hotbeds until spring, when I get them ready as fast as I want them.

Mr. Cutler: Our friend Allen piles up the manure on the surface and sets boards around it, instead of digging a deep trench.

Prof. Green: Sometimes I practice another method. I use a sash six feet by three feet, which size I consider the best. I

have the frame six inches higher in the back than in front, and put bars across every three feet for the sash. In the spring of the year I just put down a bed of manure about nine feet long, four feet wide and two feet deep. I set my frame on top of that and put my soil in there and let it thaw out.

Mr. Smith: That is exactly the way that Mr. Allen does.

Mr. Nagel: I never make any hotbeds in the fall. I have a level piece of ground which I cover from one and a half to two feet deep with manure. Of course, if I make them in February, I should use two feet, but in the middle of March eighteen inches would be sufficient. A foot will not do. In the spring we put the frames on and fill them with manure. We leave the sashes on until it heats. If there are any places where it does not heat fast enough we pour in hot water. Then we let it lie until the temperature gets below 90°. After that you can put almost anything in the bed. I think this is the best way to make hotbeds.

Mrs. Crocker: I have used Mr. Nagel's method a good deal, and have found it very successful.

HUBBARD SQUASH.

E. M. CHANDLER, MINNEAPOLIS.

(*A Talk.*)

This is something that I am a little new in yet. I have only been at it about three years. If you want an outline of my plan, perhaps I can give you a little information on it. We prepare our ground along in May, and mark it off in squares eight feet each way. We manure our squash in the hill, putting about a fork full in each hill, and put our seed in about the same time that we plant corn, say about the 25th of May or the 1st of June.

Dr. Frisselle: How deep down in the hill do you put that manure?

Mr. Chandler: Well, I put it in three or four inches deep and cover it with three or four inches of soil and put in the squash seeds in the hill, and when they come up thin them out to one and sometimes two. The hills are eight feet apart. We have one or two vines for each hill. We cultivate them during the summer and keep the weeds down as well as we can. Our soil is a very sandy soil, that is hardly fit for anything else.

A Member: How about the bugs?

Mr. Chandler: We generally put out so many squash that we don't fear the bugs. We have about twenty acres this year, and we had twenty-five

acres last year. We have enough for ourselves and the bugs, too. The only thing we fear is the grub worms. They hurt us some last year, but not much. After you get the third leaf on the squash, they get beyond harm from the bugs. The idea is, to get a rapid growth on the squash, and thus they soon get out of the way of the squash bug. It is a good idea to have squash seed kept over for two or three years—it would be better to keep it three years if you could. We have some saved ahead, but not enough yet. We think it is better to keep it over a couple of years. You get a stronger growth of vine from the old seed. We gather our squash before the frost when we can. We put them into our house and handle them very carefully in doing so. We separate the vine from the squash by cutting it off with a knife, and leave about an inch of the stem on the squash. This is a very important point. We pack them in the house without throwing around or bruising them in any way. Wherever you crack a squash shell, that squash rots, and particularly when it is put down cellar.

We have a special house for keeping squash, that we built three years ago. In regard to planting, we do not plant different varieties of squash together. We are very particular about that point. In selecting the seed we are particular to have it all of the same variety, and select it from squashes that best show the peculiar characteristics of that variety. We cultivate the Hubbard squash, and raised about 125 tons this year. We stored about sixty-three tons in our house, which is all that it would hold. Our squashes are put on shelves in the house, which is 24 by 36 ft., and 10 ft. high, and laid off into three bins. The shelves are two feet apart, and the middle alley is seven feet wide, and the two outside alleys are about four feet each. We lay a tier two or three feet deep on the shelf. The frost cannot penetrate the house, because it is built very warm. In building it, we made a plain building, and papered and sided it, and sheathed it up on the outside. We put a stove in each corner of the house, that we keep going all winter long, and the temperature runs about 54 degrees. We try to keep it there as near as we can. It is very important to keep the atmosphere as dry as you can. I exhibited a squash at the summer meeting last summer, that was as sound as when put in. The proportion of spoiled ones to sound ones will not exceed over two per cent. I cannot tell you exactly, but it is somewhere in that vicinity. It is very important that you should keep your house warm. When we put our squash in in September, we start our fires going and open all our windows and ventilators. At our last winter meeting Prof. Green told me that he thought it was a good idea to smoke sulphur in the house, and I have tried it this winter, and think it is a great improvement. Of course, it won't do any good if you wait until after the squashes commence to decay, but if done in time it will prevent that. We commenced on it after we got our house filled up. When you commence, if you smoke them once in two weeks it will do. We do not find that it whitens our squashes any; neither does it penetrate the squash so as to affect its flavor. It is not necessary to use it very much, and of course you can keep your house open when you use it. I have two ventilators in my house, and when the weather is mild, like today, I throw open the doors. I do not keep anything else in the house except squashes.

A Member: What will your squashes sell at?

Mr. Chandler: Squashes are worth about $1 a dozen. Last year at this

time I got $1.55, and the average weight was about 100 pounds to the dozen; it might have been a little less than that.

Mr. Smith: That would be about $20 a ton then?

Mr. Chandler: Yes. I would say, in reference to our house, that the first winter we only had it ceiled on the inside; fortunately, we had a mild winter and had no trouble. We had about forty tons, which we shipped to Chicago, and they sold there at $45 a ton. That was in January and the fore part of February. I have not shipped any there since. There is a gentleman in Chicago named Dunning, who lives about ten miles out, who has made a business of raising and keeping squash. I discovered his name in the *Rural New Yorker*, and called on Mr. Dunning when I was there, and went through his house. He has two houses with a capacity of 200 tons, and they are fixed up in nice shape. They had just completed a new house the fall that I was down there, which was heated with hot water; otherwise his houses are like mine. He told me that he ships to Boston a great deal, and said that he had sold squash in Boston as high as $85 and $90 a ton.

President Underwood: I wish to thank Mr. Chandler, on behalf of the society, for his very interesting and instructive description.

Mr. Smith: Just a word about those squashes. I was very much interested in what Mr. Chandler had to say, but a great many of us have no squash houses, and I am among them. Last winter I tried three or four experiments. I gathered them just as Mr. Chandler says, and I think with him that that is a very important thing that is often overlooked. I noticed a good many farmers this fall, in getting in their squashes, picked them up off of the ground and tossed them into the wagon. That don't pay. It is a great mistake. You must lay the squash down carefully. In regard to the matter of keeping, I think that I can suggest something that is within the reach of everybody. Last winter I tried the plan of putting some of my squashes under a part of my house—not exactly in the cellar, but in a kind of a dugout where it often freezes, and where it is sometimes much colder than it is in the cellar. I put some squashes there, and, although they were frosted a trifle, they were in good condition the following March and did not spoil. I also tried putting some of them on racks that hung up in the cellar, but I think that must have been too warm, as some of them became spotted. I had the best success with some that I put in a big room over the kitchen, where it did not get cold enough to freeze. I kept squashes there in good condition until April. This year I put quite a lot up there, distributing them so they barely touched each other. I looked them over just before coming here, and I could not find a single spot on any of them. I had three different varieties. I had the Boston Marrow, and they looked as sound as when they first went up there, the first of October. Any of us can keep squashes during the winter by being careful when we first handle them, not bruise them in any way whatever, and keeping them in a cool, dry place where they will get enough ventilation to prevent moulding. I find that a garret, or some room up stairs, is usually a much better place to keep them than the cellar.

Mr. Taylor: I have kept Hubbard squash in good condition until planting time, for the last two seasons. I have cut the squash in the morning and had it for breakfast, and then taken the seed out and planted it at once for the next crop. I think you will agree that that was successful keeping.

Mr. Smith spoke of handling carefully. I fully agree with him there. You must cut each squash from the vine so as not to leave a long stem on it, for, if the stem is too long, you will knock it off accidentally some way or other, and spoil the squash. I gathered my squash in a wheelbarrow, in which I put a heavy horse blanket. They were put in the garret in a large dry goods box, in the bottom of which I had placed a layer of sawdust; I then laid in a layer of squashes and carefully sifted the sawdust all around them until they were thoroughly covered, and then I placed another row on top of these, and so on until the box was filled. They kept excellently, and we had squash for breakfast long after the next planting season commenced.

Prof. Green: I have provided a very dry cellar in the greenhouse for my squashes. This room is right in front of the boiler and has a temperature of 65 degrees all winter long. It is exceedingly dry. My experience with squashes has been that they shrink somewhat if kept in such a place and, therefore, will not bring so much money if sold by weight. But they will keep until July without any trouble at all. We just lay them on the shelves. Theoretically, we are supposed to lay them just one layer thick, but this winter, owing to lack of room, we have placed them two and three layers thick. I find that the temperature of a living room is about right to keep squashes in.

Mr. Ludlow: There may be some farmers here that would like to know how they can keep them without that kind of a cellar. Now, I keep them very successfully in the hay mow. I put them in the bottom of the mow, and before the last of the hay was used the next spring we had got along into the warm weather, and there was but one rotten squash.

Dr. Frisselle: I think Mr. Smith's point is well taken. That is, that it requires these two things—warmth and dryness—in order to keep them well. It must not be too cold where you keep them. I think they keep on the same principle as sweet potatoes. If you keep sweet potatoes where it is cold, they are sure to rot, but, if you keep them warm and dry they will be all right. The dryness is more important than the heat. I notice in stores where they keep squashes for sale, they are very particular to keep them on the shelf in the upper part of the store where it is dry and warm. They tell me that if they undertake to keep them down cellar they are sure to decay.

Mr. Smith: I had an idea that they ought to be kept in a cold place, so I tried it. I found that it was not a success.

Mr. Wilcox: I would like to know if any one has tried the Sibley or Pike's Peak squash. It is a squash of very fine flavor.

Mr. Harris: It has been tried in our country, and it is liked very much.

REPORT ON VEGETABLES.

JOSHUA ALLYN, RED WING.

Mr. President and Members of the Horticultural Society:

As chairman of committee on vegetable gardening, I will say it was my intention last year to take notes, from time to time, of different things which I expected to grow, and explain here. I am sorry to say I failed to take notes and can only give these remarks from memory.

I think the past season was very favorable for vegetables except vines. The most of these latter were a failure, and all were badly hurt by the cool weather of July. Only for the unusually warm weather of September, the crop of Hubbard squash would have failed entirely Peas and beans were very good,owing to the cool, moist weather of the spring. Celery was fine for early growth, but the September heat was too much for it in many places. Owing to our climate, one year with another celery cannot be depended upon for a crop, although a few succeed in growing a fine article, and when that is the case the quality is far ahead of other places.

Onions were very fair and would have been an extra good yield but for cut worms in many localities. The price was good,and the demand more than usual.

The early sweet corn crop was immense; sold lively; good prices. We shipped to Duluth 100 dozen a day, besides supplying our markets. Potatoes, all know, were an immense crop, which I cannot account for, as the season was not so very different from others. East and west they were plentiful and good. If the great difficulty of planting so many varieties could be stopped, and only a few of the best kinds planted, a better result would soon be found. The Early Ohio, Clark No. 1 and Early Maine are good enough for any one. Fair potatoes of these kinds are never refused by the market, while many kinds are often hard to sell and sometimes refused entirely by shippers.

As for fruit in this county, it was scarce and not very good. This we found out in trying to get specimens for the fair. Very few apples were found,where years before there had been an abundance.

Raspberries were very fair and brought a good price. Blackberries are raised by very few for market in this county. Grapes as a general crop was light, but in some localities very fine specimens were grown.

SUGAR AND SYRUP.

REPORT ON SORGHUM.

SETH H. KENNEY, MORRISTOWN.

To the President and Members of the Minnesota State Horticultural Society:

The Minnesota Early Amber Cane Association was long identified with the State Horticultural Society, and finally, by a vote of their executive committee, the funds of the association were turned over to the Horticultural Society.

I have been requested to furnish a report for this society, which I do, as follows:

I planted last spring twenty-eight acres of the variety known as the Minnesota Early Amber Cane. The soil about the time of planting was very dry, and the seed did not come up as well as usual. In addition to this the cut worms on the older lands in some places took the entire crop. A cold summer, with cool nights and early frosts, made a slow growth, and September 1st it looked doubtful if the crop would ripen. But the hot weather in September ripened up the cane so that an excellent quality of syrup was obtained, that secured a rapid sale.

Grinding commenced September 23rd. The total amount obtained on twenty-eight acres was 131 tons and 1173 pounds, at $2.00 per ton with the leaves on. A good yield would have produced at least 280 tons. The amount of cane purchased at the factory was 335 tons, 111 pounds. The total amount worked at the factory was 466 tons, 1284 pounds. This cane produced 45,900 gallons of juice. It was ground and boiled in fifteen days and three hours, and produced 5,050 gallons of syrup, averaging for the season about 336 gallons of syrup for each ten hours, this being a little over 33 gallons per hour; and using about 3,060 gallons of juice each ten hours, or about nine gallons of juice for one gallon of syrup.

The value of this product at wholesale was forty cents per gallon, or an average value for each day of the syrup product of $134.40.

The cost of the cane for one day's work was $57, for the wood and daily running expenses, $26; making the total daily outlay $88. Counting the cane raised at the price of the cane bought, leaves a balance on each day's work of $51.40, storage and barrels not included, nor interest on the investment.

This has been the poorest season in thirty-three years of my experience. Not one-half a crop was gathered. The demand has been very much more than the supply.

PRODUCTION OF MAPLE SUGAR.

J. G. BASS, HAMLINE.

Mr. President and Fellow Members of the State Horticultural Society:—Being requested by your secretary to write a short paper on the production and sources of maple sugar in Minnesota, I thought perhaps I might be able to give a few facts that have come under my observation in the production of maple sugar in my thirty years experience in its manufacture in Minnesota, and ten years in my native state of Vermont, where they produce the finest flavored article found in our markets. In fact, Vermont is as famous for her maple sugar as the Jersey cow is for prime butter.

When I located in Scott County, on the border of the Big Woods, the rock, or sugar, maple was one of the leading attractions, as it recalled many incidents of sugar making in my boyhood days in the Green Mountain state, gathering sap and wading through three feet of snow, as they often do when the sugar season opens up. Boiling the sap and making sugar was always a pleasant task in my younger days. And now, as old as I am, if I now lived in the maple timber, I should still continue in the business, for there is no other sweet manufactured that has such a delicious flavor as the sugar and syrup produced from the sugar maple.

In the big woods in Scott, Le Sueur and Carver counties, and, in fact, in many other places in the state, the sugar maples are plentiful. If the people living in the woods, or convenient to the sugar maple, understood the business, they might derive considerable benefit and also add a great luxury to the family table.

I commenced the manufacture of maple sugar in Minnesota in the spring of 1854, and continued it every year till 1888, and with few exceptions, I have always found it profitable.

The rock, or sugar, maple is regarded as the prime source of maple sugar; but no doubt it is well known that in northern climates all species of the maple yield sap containing more or less sugar, though it is conceded that no other species than the rock maple makes a fine flavored article such as we get from the rock maple growing on the hillsides of Vermont.

More favorable conditions exist for a plentiful production in Vermont, as their climate is not as dry as ours in Minnesota. But we should not get discouraged, if we can't make as much as they do in Vermont. I have noticed that the quantity and quality of sap vary with the situation of the trees, their age and size, the nature of the season and of the preceding season, the meteorological conditions and the methods of tapping. A summer of plentiful rain and sunshine is what furnishes the trees with abundant saccharine matter, causes its deposition in the vessels of the wood of the tree, and undoubtedly prepares the trees for a plentiful harvest of sugar for the subsequent spring.

The quantity of sap obtained from different trees depends on the method of tapping. The depth of the bore should never be more than two inches, as the outside of the tree contains more sap than the heart and of a better quality.

The size of the bit is also of importance. A small bit does not injure the tree as much, and the wound heals over sooner. A half-inch bit is about the right size. Generally, the lower the tree is tapped the greater will be the yield.

Trees tapped on the south or east side yield sap earlier and in larger quantities, than when tapped on the north or west side. Frequent tapping I also regard as a great factor in production, as the sweetness increases in proportion to the frequency of tapping.

The time for tapping varies with the season. Generally the season opens from the middle to the last of March. Never tap till the sap starts freely, but trees want to be tapped as soon as that time arrives, as the old saying is, "Make hay while the sun shines."

Now, if you make maple sugar, to be successful you must be sure to be up and on hand when the season opens up, for a penny saved is worth two earned. Eight-quart tin pails should be used, made slanting, with a loop or eye turned in the wire running around the top of the pail, so they can be hung on the spout or nail, so the wind can't blow the sap away from the buckets. The easiest and most convenient way to gather sap is to take a large barrel and cut a hole in the centre of the poorest head large enough to dip the sap out, when hauled on a sled to the stove tub by the arch and pan, where the boiling is done. The pan must be kept clean and free from any burnt sugar. If care is taken when syruping off, you won't be troubled with any burnt sugar, if you do not have too hot a fire. A very small fire is best when the syrup is thick enough to flake off the dipper as you take it out of the boiling syrup and hold it up two feet above the pan. Then take it from the fire and strain while hot; then let it cool and settle; then turn off the top till the settlings begin to run; reduce the settlings with sap or water till the sweet is all out, and then boil the same to a syrup. Then all that is clear from settlings, sugar off. Skim the scum off before it comes to the boiling point, and when thick enough to wax when dropped into cold water, it is done. It will then be good enough to tickle the palate of a king.

LANDSCAPE GARDENING.

PARKS FOR SMALL TOWNS.

PROF. H. W. S. CLEVELAND, MINNEAPOLIS.

Most people who have not paid special attention to the subject are apt to suppose that parks are only wanted by large cities, and would be superfluous luxuries for small towns. It would be a more truthful statement of the case to say that, while absolutely essential in large cities, no town that has or ever hopes to have, as many as 10,000 inhabitants should fail to make provision for such an area of public ground as will suffice for the wants of its inhabitants, and in which every one has a common right. The term park is so universally applied to all public grounds, that it is perhaps useless to attempt to adhere to the strict definition of the word; but, if we call every tract of public pleasure ground a park, it becomes necessary in every case to specify the kind of park we refer to, whether a driving park or a park for pedestrians only, an extensive area comprising varieties of natural scenery, or a mere city square planted with trees and arranged with walks.

The fact has come to be fully recognized in theory, that rest and recreation are essential to the best development of moral and physical character; but we are slow to carry our theories into practice. We make every provision, at whatever cost, for public business and public work, but none for public amusement and recreation. We say virtually to the people: "Those of you, who have not the means to indulge in the costly amusements provided by individuals, must look out for yourselves. No public money must be used to furnish places or means whereby you may refresh your weary limbs or gather new heart for life's conflicts by rest and communion with nature."

Perhaps it may be conceded that a mere rural village, which can never attain a larger population than can be numbered by hundreds, needs no such provision beyond what may be furnished by a village improvement society. The fields and woods in the immediate vicinity of such hamlets are easily accessible, and the number of those who seek them is not so large as to make their presence objectionable. But when a town attains such a size that individuals or parties of its citizens are resorting daily to the neighboring country for recreation, their visits become such a source of annoyance to the farmer, that in self-defence he is forced to put up the sign of "No trespassing on these grounds."

Then, the want of a place of resort for pic-nic and pleasure parties induces some individual to supply the demand by making a park of some portion of his own grounds and charging a fee from those who use it. The fact that such a measure rarely fails to prove profitable to the proprietor is a sufficient indication that the demand exists, but there are many and serious objections to such a mode of supplying it. No indi-

vidual will go to the expense of making a thorough and fitting arrangement of such a tract for public use, and, on the other hand, those who resort to it can have no such assurance of protection, as is afforded in a public park of which every visitor feels himself to be a joint proprietor. No better proof of the superior estimation in which parks are held could be afforded, as compared with such resorts as are offered by private parties to supply their place, than the well known fact that the immediate effect of selecting any area for a public park is to enhance the value of adjacent property for residence sites; whereas,a private resort of the kind, however well it may be conducted, can never become so free from doubt and apprehension that its vicinity will be sought for such purposes.

I need do no more than remind you of these simple facts to convince you, first, that wherever a community of a few thousand people is gathered together, there must be frequent demand for a place where a large number may assemble in the open air, or where individuals or small parties may seek relief and recreation from the toil and care which are the attendants of their daily life; and second, that this demand can be but poorly and insufficiently supplied by the efforts of private parties who are instigated only by motives of self interest.

Is it not the part of wisdom to recognize the now well established scientific fact that rest and recreation are just as essential to the best development of manhood as sleep and food, and provide generously for their rational indulgence under such regulations as shall prevent their abuse, instead of ignoring the whole subject,as if the necessity implanted by nature was to be regarded as a weakness that should be conquered?

Every intelligent man will give an affirmative answer; and the fact that all large cities have been forced by necessity to make such provision, affords such evidence of its existence,that the only doubt remaining is that of when the work should be commenced, or how long the duty may be safely postponed.

The idea is so generally prevalent that parks are of necessity costly luxuries, that people shrink from the thought of them as a needless addition to the burden of taxation. In fact, this apprehension is due to a mistaken conception of their requirements, and largely also to the fact that their construction has so often been attended with wasteful and unnecessary expenditure, that the idea has become fixed that the object can only be thus attained. A little reflection will serve to disabuse the mind of this mistaken notion. The parks of a great and wealthy city may indeed be appropriately adorned in a manner that is in keeping with its architectural elegance; but even here the tendency is to a wasteful extravagance in tasteless and ostentatious display of artificial decoration, to say nothing of cheap imitations of works of art which betray vulgarity of taste as plainly as the wearing of imitation jewelry.

The requirements of a small town are very different from those of a large city, and if a little common sense is applied, first, to the question of what is wanted, and next, to the means for its attainment, it will be found in almost every case that they may be secured without any extravagant outlay.

In selecting a site for a park, the mistake is often made of seeking an area possessing such naturally attractive features as render it intrinsically valuable for residence sites, so that the first cost is necessarily large;

whereas, a little investigation will almost always reveal the existence of tracts, which for some reason are not thought desirable for residence sites, and may, therefore, be had at a comparatively low price, and may, at small cost, be so improved as to adapt them admirably for park purposes, and by so doing increase the taxable value of all adjacent property so essentially as to make the investment a profitable one. This has been so fully demonstrated in the experience of different cities all over the country, that it may be regarded as an established fact in the history of parks. A tract of land may possess picturesque features, such as ravines or ledges, which make its improvement too costly for any individual to undertake, or it may require a system of drainage that no one man can compass. While such tracts remain unimproved, they are of course unsightly and detract essentially from the value of adjacent property. If purchased by the city and improved as parks, the very features which rendered them unfit for residences may contribute to their attractive interest as pleasure grounds, and their development will serve at once to confer value upon all adjacent property.

The best criterion of what is wanted by those who seek relief from the cares of life in cities is to be found in the objects they pursue when they try to escape from them. There is a large class of people, who neither seek nor require any other recreation than the sight of a game of ball or a horse race or other sport at which great multitudes are assembled, and the enjoyment of which is entirely independent of the adjacent scenery.

All that they require, therefore, is a large area of open ground. The seclusion and rural attractions, which constitute the most winning charm a park can offer to those who seek relief in its shades, are not only valueless to those who delight in the sports above alluded to, but such sports are utterly incongruous with the objects for which parks are specially designed. I allude to the subject because there are multitudes of people who seem to have no other idea of a park than a place for popular amusements in which anything is admissable that would draw a crowd. It cannot be too often or impressively urged that the primary object of a park is to provide for the wants of all whose lives are oppressed by the care and anxiety which are the necessary attendants of all who mingle in the great struggle of life, with a determination to fulfill its duties, whether in the line of director of a widely extended business, embracing vast and complicated interests, or that of the humble laborer striving to provide for his family. The demands of modern social life are such that the need for means of relief and refreshment is imperative. They are recognized and acknowledged by all civilized nations. We have been the last to take action in the matter for the simple reason that we have been the last to feel its necessity. But the work which has been in progress of late years in the creation of parks in all our cities, and the invariably beneficial results that have ensued, proves clearly the wisdom of the measure. The principle on which those results are based is the same in all communities, be they large or small, and differs only in degree. With the experience our history affords of the growth of great cities in the wilderness in the space of a single generation, it is not safe for any town to assume that it will never attain such dimensions that parks will have to be provided—and no fact in the history of parks is more clearly proved, than the danger of delay in the purchase of lands for the purpose, and the penalty of enormous cost which has resulted from it.

The people of Lynn, Mass., have set an example in the preservation for public use of a large tract of wild land, which is already exciting such general admiration as proves the wisdom of their action, and to incite other towns to imitate them. The tract contains some 1,600 acres of wild land, comprising gigantic boulders, deep ravines and rocky summits and is very largely covered with forest, all of which is to be preserved in its natural character, or only so far developed by roads, paths and artificial structures as will make it available for use as a delightful place of resort. It is not even to be called a "Park," but is to be known only as the "Lynn Wood," and every one who has any just appreciation of natural beauty as contrasted with artificial imitations of it will recognize the value of such a possession, while those who are governed only by motives of worldly interest may learn from such an example that no better investment can be made by a town than such an addition to its attractions.

FLORICULTURE.

REPORT ON GREENHOUSE FLOWERING PLANTS.

AUG. S. SWANSON, ST. PAUL.

In the first place, I cannot but dwell somewhat upon the great improvement made every year in such flowering plants as roses, carnations, chrysanthemums and begonias; and their mode of growing, in which there are annually improvements being made, as we learn more and more about them. In roses we have among the ever-blooming class several new varieties designated as teas and tea hybrids, the last two or three years received, and the last season they have been quite extensively grown, so we can now with some knowledge claim they are an improvement upon older existing varieties. First among these of recent introduction is Duchess of Albany, a sport of La France, but with much deeper color and more substantial flower, and hardier and more vigorous constitution, which makes it give us better results, in the short wintry days, with so little sun. It is, according to reports, even more floriferous and a better paying rose than La France. The Waban is a sport from Mermet, which it resembles in everything, the same as Duchess of Albany resembles La France. It has a deeper, better color in dark weather; also is claimed to be a more vigorous grower. There is no doubt but in some respects it is a good improvement over the parent plant, the Mermet. Mme. Hoste is a comparatively new rose, not grown to any great extent till the last season. Its most remarkable characteristics are enormously prolific blooming even as young plants, very pretty shaped buds, and blossoms of great substance. It is the best keeping rose I am acquainted with, whether left on the plants or cut. It is of a very light creamy yellow color. The flowers when well grown will compare favorably with any tea rose; and for a fact, will produce flowers the size of large Marechal Neils. Clotilde Soupert is a new introduction of the small *rosa multiflora*. It is a great improvement over older existing varieties in size of flowers as well as general character. It is larger and more robust growing than most of its progenitors, and a rose in every way well worthy of a place among the roses in greenhouses for winter flowering, and I have no doubt but it will make a capital bedder out of doors.

Among carnations the improvement goes steadily forward, many new varieties having been introduced the last year, all claimed to be great improvements over existing older varieties, and in a few years we hope to see the ideal carnation brought forward, with its flowers four inches across and on long, stiff stems with elegant foliage, well up in the flower's sweet perfume, and a free and continuous bloomer, never bursting the calyx. There are so many new ones, that I will not attempt to enumerate any of

them, as there is no doubt that they are all good. As we have the last year learned, the leading carnation growers of the country have organized themselves into a society for the protection of this flower's interest, and they will no doubt see to it that no doubtful varieties are disseminated.

In chrysanthemums the improvement is more marked even than in any other class of flowers. Those sent out last year were all very good indeed, some of them really wonderful improvements over only a few years ago. New varieties are coming in almost too fast for the good of the flower. I am afraid it will have a tendency to lessen the interest taken in the chrysanthemum the last few years. I will not attempt to name any of them, as there are hundreds of varieties, probably one as good as the other—it would be a hard matter indeed to pick out a few of them. It may be noted that the mode of treatment has almost entirely changed from growing them outdoors during the summer; they are now generally grown under glass continuously from time of propagating till cutting the flowers.

In begonias we have also seen a great improvement the last few years, notably so in tuberous-rooted begonias. This class is improved now so it is really a grand class of plants. They are in some sections of the country taking the place so long held by geraniums for bedding out in summer, they making even more show than this well known old favorite. Whether they will drive out the geraniums here in this state is as yet doubtful, it being open to question wheher they will do as well in our hot and dry summers as they will where it is more moist. They are, nevertheless, well worthy of a place in the greenhouse for decoration of rooms, or even as cut flowers I believe they may be made to pay. I would advise every florist to give them a trial. Of other varieties of begonias, many new ones are introduced every year now, and many of them are undoubtedly destined to take a prominent place among bedding plants before long.

In conclusion I wish to say I do not believe the last season has been a very prosperous one for the florist, whether on account of overproduction or other causes I do not know, but certain I am that at the prices ruling last spring for bedding plants, the margin of profit was very small, indeed in many instances I am sure the prices realized represented a loss instead of profit on the goods sold. Prices for cut flowers were probably up to the average the latter part of the season, but still without realizing anything for the growers, as the season has been remarkably against us; part of the month of August was so cold as to give many plants, notably roses, such a check that in many insta nces they have not yet recovered; then September came in altogether too hot to suit the greenhouse man, it forced his crop of bloom in a time when there was no demand, and weakened his plants so, that when the cloudy and dark days came—and we have had an unusual number of them the last month—they were not in proper shape or condition to bring forth their blooms. Roses, carnations and violets suffered most, the latter in particular has just commenced to recuperate from the hot spell of last autumn. Taken all in all, I think it has been an unprofitable season for florists in this state, even the only chrysanthemum exhibition held in the state of Minnesota the last season was a failure financially, although well worthy of a better fate.

REPORT ON HOUSE AND GREENHOUSE FLOWERING PLANTS.

E. NAGEL, MINNEAPOLIS.

I think this report had better be about flowering plants best adapted to house culture, as that is what most people would like to know. It seems easy for anyone acquainted with plants to select what he wants, but for one not knowing much about it to take a catalogue and pick out what is wanted by the description is quite difficult, especially in the new things called novelties, most of which are worthless, but which people will buy on account of the high prices and the glowing descriptions. For instance, last spring the wholesale price of the Waban rose was $1.00 each, and in the fall it was $8.00 per hundred. So it is with nearly all novelties. It is better to go slow on new varieties of plants, until they have been tested and found to be what they are claimed to be, for, if not really worthy, they will be dropped from the list in a year or two.

My aim in this report is to give a list of those flowering plants that, in my opinion, are best adapted to house culture, and that every one can grow. I will make it as brief as possible.

Abutilon (Flowering Maple).—Flowers pendulous or bell-shaped; several colors, white, pink, yellow and red; flowers freely during winter and spring.

Achania Malvaviscus.—Resembling somewhat the former, color bright scarlet, free flowering, flowers on the end of every branch.

Azalea Indica.—Native of China, a greenhouse shrub; when in full bloom the most gorgeous window plant in cultivation; colors, pure white, variegated, pink, bright scarlet and dark red. Season for flowering naturally about March and April, but will stand forcing and can be had in bloom by Christmas. Most people have an idea that after blooming they should rest, but that is a mistake, and many plants are spoiled in that way. They make their season's growth right after blooming, and they must not be neglected at that time. Give them a good, light, cool place, keep them watered like other plants until spring, about the middle of May place them outside in a bed, and do not neglect to water them. They will thus bloom year after year.

Begonias.—This is another valuable house plant, always clean, never affected by insects. There are many varieties, all good house plants. The tuberous-rooted bloom only in the summer.

Chrysanthemum.—This is one of the best and most fashionable blooming plants for fall and early winter. There is an endless variety, divided into three different classes, the Chinese, Japanese and Pompon. The Pompon are the small flowering ones and are the easiest to grow; the Chinese have large, regular shaped flowers, and are somewhat harder to grow than the former. The Japanese, are the hardest to grow, and are the most fashionable. The flowers are large, irregular and fringed, and, if not properly treated, most flowers will be imperfect.

Carnations—Can be had in bloom all winter; a great many varieties, white, pink, scarlet, variegated, dark red and yellow. They should be made from cuttings in the fall or early part of the winter, planted

out in rows in the spring, and cultivated during the summer, being pinched back once or twice, and they will be ready to bloom by the first of September, when they can be potted and taken into the house. There is a new kind of carnation, the Marguerite carnation, which can be grown from seed and bloom the first summer. It comes in all colors except yellow, is very sweet, and will be in bloom by the first of July, and bloom freely all summer. It gives more flowers at that season than any other carnation.

Calla Lily.—There are four kinds, large flowering, small flowering, or dwarf, spotted-leaf calla, which flowers only in summer and rests all winter, and the black calla, *Arum sanctum*, a species from the Holy Land.

Cineraria.—All colors, blue, violet, crimson, pink, maroon and white; raised from seed, which should be sown in June or July.

Cyclamen—Very pretty blooming plant; blooms from January till April; grows from seed, forms a bulb and rests during summer.

Freesia Refracta Alba—One of the most attractive winter flowering bulbs grown; pure white lily-like flower, very fragrant. Bulbs should be planted in succession from September to December, and be kept in a light, cool place until well up. After that they may be put in a warm place, but they must have plenty of light and sun.

Geranium.—A general favorite. We used to think the single ones were the best bloomers, but in the last few years we have had so many double ones that bloom just as well, if not better than any of the single varieties. Some of them are G. A. Nutt, Illuminator, Edmund About and Golden Dawn.

Fuchsia.—Another well known favorite; Black Prince, Speciosa, Rose of Castile, Snow Fairy and Prince Napoleon are the best bloomers.

Gloxinia.—A handsome, summer blooming, bulbous plant, blooms from July to September.

Hetiotrope.—Flowers light and dark purple; blooms freely in winter. Should be re-potted often to keep it blooming.

Ivy Geranium.—Fine basket plants; blooms freely in the spring and summer.

Lilium Harrisii—Bermuda Easter Lily. Can be had in bloom by Christmas if kept warm enough. Bulbs should be planted from October to December.

Lilium Candidum.—Common Easter Lily. Should be treated same as the preceding one.

Petunia Double—A great variety, grown from cuttings and from the seeds.

Primula Chinenses.—One of the best house plants; blooms from January till May; grown from seed; colors, white, red and pink.

Primula Obconica—White, always in bloom; best flowering plant grown for house or greenhouse.

Roses.—A great many varieties, but not many for house culture. Hermosa, light pink; Agrippina, dark red; Clotilde Soupert, soft flesh color, pink in center; and some of the teas and hybrid teas, such as Bon Silene, Perle des Jardins, Sunset, Bride, Madam Hoste, La France and Duchess of Albany, which are all good winter bloomers.

Winter Flowering Bulbs—Most of them are imported from Holland. They are the

Dutch Hyacinths; colors, red, white, purple, pink and yellow.

Roman Hyacinths.—White and rose, mostly used for cut flowers.
Narcissus.—Yellow and white.
Tulips.—Red, yellow, pink and white.

All of these bulbs should be planted in the fall for house culture in pots. The pots should be kept in a cool cellar. The best way is to cover them with three or four inches of earth, and let them remain from one to two months or until the growth begins to show through the earth. After that take them into a warm room where they have plenty of light, but not too much sun at first until they get accustomed to it. Give them plenty of water and nice flowers will be the result.

One thing more I would suggest, that is, to buy your plants and flowers of the florist at your own town, or if there is no florist there, as near home as possible. Never buy of the agents, for you will always have to pay more for the pictures they show you than for the plants.

GREENHOUSE FLOWERING PLANTS.

AUG. S. SWANSON, ST. PAUL.

Mr. President and Members of State Horticultural Society:

Having just spent the last ten years in this state, engaged in the florist business, during which time I have seen what wonderful progress the state of Minnesota has made in all other industries, and knowing that our profession has progressed very rapidly (probably too rapidly for its own good) all over this country, it suggested itself to me that it would probably be of some interest to look back to the beginning of the period I have been in Minnesota and see what "Progress the Florist Business in the Last Decade" amounts to in this state,—whether it has kept pace with the general advancement of industries and pursuits. I think, from the statistics I will present, we will find it has done so.

From the last census report we learn that, as an industry, floriculture has been for the first time made a subject of census investigation; and Mr. J. H. Hale, the compiler of reports relative to floriculture at the last census, begins his report with these words: "While flowers and flowering plants were grown for sale to a very limited extent in this country one hundred years ago, the business of the commercial florist has made the greater part of its development during the past twenty-five years, and the larger proportion of this business the past ten years." After inquiry of every florist in the United States, the report recites that "there was but one commercial florist in the country in the year 1800, and only three establishments started between 1810 and 1820; eight more were started the next decade, twenty-five the next, followed by forty-five between 1840 and 1850; 96 between 1850 and 1860; 313 were established between 1860 and 1870; 998 between 1870 and 1880; 1,797 between 1880 and 1890."

From this we see that the florist business has increased during the last ten years in the number of establishments about 130 per cent. This is certainly a very great increase, but still it does not tell us the increase of capacity, which no doubt is more than 200 per cent. Now, what interests us is this: Has the florist business made as rapid progress here in Minne-

sota as in other and (for that industry) more favorably located states? I think it has kept pace with most of them. As near as I am able to learn there were in 1881, or, to be more correct, at the beginning of 1882, 18 persons engaged in the florist business, operating a total of about 86,000 square feet of glass. At the present time there are to my knowledge 60 persons engaged in the business, and operating a total of 439,000 square feet of glass; an increase in number of establishments of over 300 per cent, and in capacity of over 500 per cent. This places the state of Minnesota as No. 18 in regard to number of establishments, and No. 17 as regards capacity or amount of glass, as compared with the other states; certainly not a bad showing, taking everything into consideration,—the short period the state has been in existence, and the climate, which we may praise as we will and insist upon its being the most glorious climate on earth, as it may be for raising No. 1 hard. It is, nevertheless, a hard climate for the florist to contend with, the fuel question being one of his heaviest items of expense and one engaging his most serious attention. According to my experience at various places, I believe it costs us here on an average $70.00 per 1,000 square feet of glass to keep warm, and thus the sum of $31,000 will have been expended for this item alone this winter. Nevertheless, the florists in this state are well satisfied to receive the same prices for their products as the florists of the Eastern states, where the cost of heating is just about one-fourth. This shows that we must have advanced as fast as they, or they would certainly undersell us. As to prices for our products, they have on an average fallen 50 to 70 per cent. in the last ten years. To be able to keep up under these adverse circumstances shows that we must have been able to effect savings somewhere, either one way or the other. This has been done in various ways; first, by improved buildings, enabling us to grow more and better stuff in the same amount of space; second, by improved methods of heating, whereby we maintain a more uniform heat at less cost, (steam heating seems to be the mode giving the best general results and it seems to be almost universally adopted for all larger establishments;) third, by growing better paying classes of stuff and discarding everything that can not be made to pay; fourth, by the better methods adopted, quite a saving in labor is effected. Thus it may be seen that our profits are generally made up of what ten years ago went to waste.

Our business is something that almost wholly depends upon the larger cities for existence; hence the good showing the state of Minnesota makes in the matter of floriculture is to be credited to her two larger cities, St. Paul and Minneapolis, these two cities alone taking 40 of the 50 established florist concerns, with 352,000 square feet of glass, leaving a balance of 87,000 to be divided in the various smaller cities. The progress in various lines of the business has kept well up with the increased capacity of the greenhouses. I am quite certain that we this year average more flowers produced in Minnesota in one day than in twenty, ten years ago, and these are sold at not exactly the same prices as ten years ago, but probably at as good a profit to the individual, and certainly a good deal better for the state at large. Ten years ago there was probably $50,000 worth of flowers shipped to Minnesota from other states, and the next five or six years following considerably more, while the past year I think we have exported a great deal more than we have imported.

RED SPIDER AND GREENHOUSE PLANTS.

(*A talk.*)

F. G. GOULD, EXCELSIOR.

I am no apologist for the red spider. I think I can safely say that I am not lost in admiration of him. I find that the spider is too small to be seen with the naked eye, but he is there just the same; and his work is generally done before he can be found. Many different things have been tried and have utterly failed in dislodging him; but there is one thing that I can recommend, that I have found successful; and that is, wash him. A good washing will generally dispose of him. There are some plants on which he cannot live, and the geranium is one. In this connection, I will couple what I would have said on the subject of greenhouse plants, with my remarks on the red spider. When you attempt to grow plants for ornament, you like to have as many nice plants as your surroundings will admit of. A few practical people are satisfied with a few practical things that are the best. So far as my knowledge goes, half a dozen plants or so comprise enough to make a grand collection for any place. Among the kinds of plants for ornamental purposes that I know of, at the head of the whole list I shall place the geranium—the entire family of geraniums. They have striking colors and make a good display in-doors as well as out of doors, and they are less subject to the attacks of insects. They will stand the greatest variation of temperature, and all kinds of atmospheric conditions. They do not require any particular kind of soil, except that they are shy of a moist locality, and they will live and thrive where most plants would die of neglect. I will name a few other plants as coming next to the geranium for general use. I speak from experience; that is, my own experience. The heliotrope is reliable, and while it is somewhat modest in its appearance, it is useful. Now the sweet alyssum is a plant that does not make any great show itself, but it has a very wonderful effect when placed with some of the other flowers, the rose for instance. I will not take up any more of your time, but will thank you for your attention.

PLANS FOR FLOWER BEDS.

Prepared to accompany an article on "Designing Flower Beds," published in the Report of this Society for 1891, page 254.

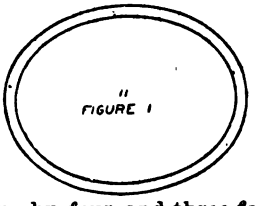
E. NAGEL, MINNEAPOLIS.

Very handsome flower beds can be made from the following plans:

The sizes of beds and number of plants required are given, that they may be exact guides to the planter.

The size of the bed may be changed, of course, to suit the grounds, the taste or the purse of the planter.

GERANIUM BED.

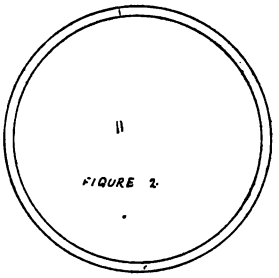


This bed, if six feet long by four and three-fourths feet wide, requires the following plants:

Space I. 32 Sweet alyssum (or any other of the border plants named) set in one row, six inches apart.

Space II. 35 S. A. Nutt geranium (or any other single variety) set eight inches apart each way.

GERANIUM BED.



This bed, if six feet in diameter, requires the following plants:

Space I. 36 Centaurea (or any other border plant) set in one row six inches apart.

Space II. 40 Queen of the West geranium (or any other one variety) set eight inches apart each way.

This bed, if eight feet in diameter, requires:

Space I. 48 Border plants, at six inches apart.

Space II. 80 Geraniums, at eight inches apart each way.

FOLIAGE BED OF COLEUS.

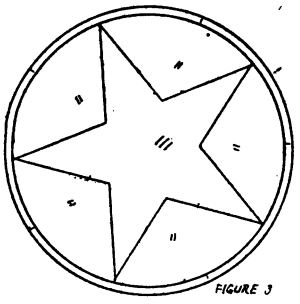


FIGURE 3

This bed, if six feet in diameter, requires the following plants:
Space I. 36 Cineraria Maritima (or any other border plant named) set in single row, six inches apart.
Space II. 40 Verschaffelti coleus, eight inches apart each way.
Space III. 28 Fair Oaks coleus, eight inches apart each way.

This bed, if eight feet in diameter, requires:
Space I. 48 Border plants, six inches apart.
Space II. 48 Verschaffelti coleus, eight inches apart each way.
Space III. 32 Fair Oaks coleus, eight inches apart each way.

FOLIAGE BED OF ALTERNANTHERA.

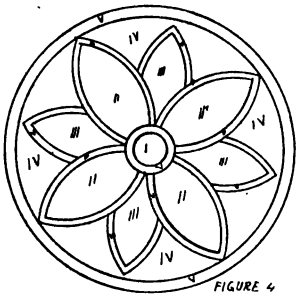
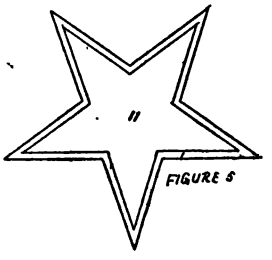


FIGURE 4

This bed, if six feet in diameter, requires the following plants:
Space I. 1 Dracæna Indivisa in the center.
Space II. 72 Alternanthera Versicolor, four inches apart each way.
Space III. 45 Alternanthera Spathulata, four inches apart each way.
Space IV. 90 Alternanthera Aurea Nana, four inches apart each way.
Space V. 150 Echeveria, set in single row, four inches apart.

PANSY BED.

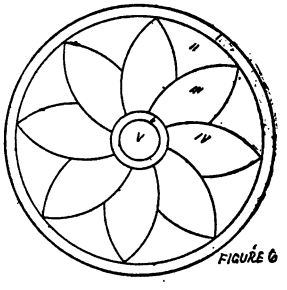


This bed, if six feet across, requires as follows:
Space I. 40 Sweet alyssum, in a single row at six inches apart.
Space II. 25 Pansies, at six inches apart each way.

This bed set all in pansies would take 65 plants.

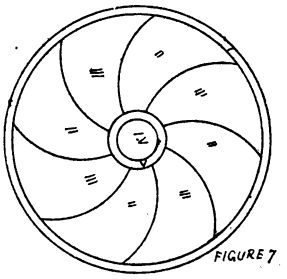
Fig. 5, as a COLEUS FOLIAGE BED, requires:
Space I. 40 Centaurea, at six inches apart in one row.
Space II. 25 Fair Oaks coleus, at six inches apart each way.
Geraniums may be set in place of the pansies or coleus in either of the above.

FOLIAGE BED OF ALTERNANTHERA.



This bed, if six feet in diameter, requires for
Space I. 64 Achyranthes V. at four inches, in a single row.
Space II. 50 Alternanthera Versicolor, four inches apart each way.
Space III. 63 Alternanthera Spathulata, four inches apart each way.
Space IV. 63 Alternanthera Aurea Nana, four inches apart each way.
Space V. 1 Dracæna Indivisa in the center.

COLEUS FOLIAGE BED.



This bed, if six feet in diameter, requires for
Space I. 36 Centaurea, at six inches apart in a single row.
Space II. 40 Verschaffelti coleus, six inches apart each way.
Space III. 40 Fair Oaks coleus, six inches apart each way.
Space. IV. 1 Dracæna Indivisa in center of the bed.
Space V. 9 Cineraria Maritima, in a single row, six inches apart.

This bed, if eight feet in diameter, requires for
Space I. 48 Centaurea.
Space II. 72 Verschaffelti coleus.
Space III. 72 Fair Oaks coleus.
Space IV. 1 Dracæna Indivisa.
Space V. 9 Cineraria Maritima.

The description of the different beds might be continued at great length, but, instead, the reader is asked to apply the general principles above outlined, and select from the infinite variety of attractive forms and combinations possible within the limits of good taste and pleasing effects.

OUT-DOOR FLOWERING PLANTS.

MRS. ANNA B. UNDERWOOD, LAKE CITY.

The past season in this locality was especially trying to all classes of vegetation. When large shade trees are perfectly bare in August from lack of moisture, there is not much chance for the growth and development of plants and shrubs. Those flowering in the early part of the season did well, giving good blooms and plenty of them.

In the flower garden, among the annuals, the petunias, marigolds, mignonette and verbenas made a bright showing. The gladiolas gave good satisfaction. I must mention especially a bed of Crozy cannas that reveled in the hot, dry weather, and looked with pity on their suffering friends. A bed of gaillardia attracted a good deal of attention. They are very showy for house decoration, as they last many days, and fine for out of doors, as the period of blooming covers many weeks.

Last spring I bought a dozen bulbs of the caladium; procured a half dozen kerosene barrels, cut them in two, painted them a dark green, filled them with earth, placed one bulb in the centre, and when it was well up sowed a few nasturtium seeds around the edge of the barrel. These were placed in different parts of a small park in our cemetery, where they could receive a thorough watering once a week, and were very handsome. Being in such large tubs they did not dry out quickly and required but little care.

I have been told that lantana can be grown in large tubs in this way until they become very large shrubs, placing in the cellar during the winter to remain dormant until spring. I have a dozen plants that I intend to try in this way.

There is always the blissful anticipation that next season will be more favorable; and so, after a little rest from discouragements, the spirits rise, catalogues are consulted, plans made, and spring finds us as enthusiastic as ever. How fortunate it is that we cannot look into the future!

FOOD PREPARATIONS.

PICKLES AND CANNED FRUITS.

MRS. ANNIE BONNIWELL, HUTCHINSON.

Mr. President, Ladies and Gentlemen:—It seems to me that our worthy secretary has given me rather a hard task to perform. I was requested to make a report on pickles and canned fruit, and, of course, you will expect something new, and it is almost impossible to do this, as every newspaper is teeming with receipts, and receipt books whose name is legion fill every nook and corner of every housekeeper's domain. So, really, how can you expect me, who fills but a small corner in this great department of cooking, to give receipts that will be of real value to the readers of our reports. But as I have been requested to perform this task, I will proceed to give what few receipts I have been able to gather, that I consider the most valuable.

CANNING STRAWBERRIES.

Put in a porcelain-lined kettle one-quarter of a pound of sugar to each pound of fruit, add one teaspoonful of boiling water to each jar and dissolve; prepare the syrup before you do the fruit, and cook the fruit in the jars. When done, add one and one-third cups of syrup and enough warm water to fill the jar.

CANNED PEACHES.

Pare the peaches with a silver knife, if possible; cut in half and lay in cold water till ready; put on the stove a pound of sugar with a quart and a half of hot water turned over it, and let it cook to a syrup. Set your jars on a cloth in hot water, and fill them with the cold peaches, putting a layer of sugar between the peaches. When the jar is full of peaches, fill up with the hot syrup and seal immediately.

CANNED GRAPES.

Carefully pick from the stems and wash the grapes, removing the skins, and drop the pulp in one vessel and the skins in another. When all are thus prepared put the pulp in a preserving kettle over the fire, and stir constantly until the seeds come out clean; then press the mass through a colander, add the skins to the pulp, weigh them, and to one pound of grapes allow one-half pound of sugar. Boil one hour and a half and put in glass jars while hot and seal.

PICKLED PEACHES.

Take ripe, but not too soft peaches and put a clove in each one; take two pounds of brown sugar and one gallon of vinegar, boil up twice and skim, pouring while hot over the peaches and covering tight; in a week or two pour off and scald again, after which they will keep nicely.

CUCUMBER PICKLES.

One hundred green cucumbers about two inches long will fill four glass jars. Soak twenty-four hours in rather strong brine, then pour off the brine and rinse in clear water. For this number of cucumbers use three quarts of pure cider vinegar, one cup of sugar, one ounce of whole cloves, one ounce of stick cinnamon, one ounce of small black peppers, a little horseradish sliced, and a few small red peppers; scald the cucumbers in the vinegar, and, as soon as the vinegar is scalding hot, dip them out, fill the cans, and then pour the vinegar over them till the can is full. Seal hot.

BREAD MAKING.

MRS. O. C. GREGG, MINNEAPOLIS.

During the past year, in conversation with ladies here and there, I have found a general lack of knowledge of what constitutes good bread, or of the best method of the simple process of bread-making.

Many hold tenaciously to old methods, and only the few are willing to be taught, or think there is any necessity for teaching. Because they can make what are called "high biscuit" and bread "as light as a feather,' they consider themselves adepts, and to any suggestion to learn a scientific method answer very complacently: "My family are satisfied with my way, I do not think I need to learn;" or "I have no time for it; I think, perhaps, it would be well for young housekeepers to be instructed, but we old housekeepers know enough already." Ah! When will humanity learn that it is the teachable spirit which advances, and that "the willing and obedient shall eat the good of the land." But progress is slow in all departments, science is slow in her investigations; and when she offered her long sought truths, those who should gladly receive and practice them are slow to accept them. Indeed, it is but lately in modern history that science has turned its attention to home life. It is but recently that we find such terms as "Household Philosophy," "The Chemistry of Cookery" and "Science in the Home," in popular periodicals. We have been living according to traditional methods, and but few cooks can rise and explain why they do thus and so. They are merely able to give the rules which they follow, and sometimes will not assume that it is possible to be sure of the results, when these are followed. Scientific cookery should be king in cookery, and it, like all kings, needs a herald; for, as Christ himself had a John the Baptist, so does the art of scientific cooking need one going before and proclaiming repentance for the kingdom of God at hand; for we do most persistently affirm that the passage which states that the kingdom of God is not meat and drink, does not depreciate food nor militate against the right preparation of it. It merely affirms the fact that food is not our highest good, because it supplies only our physical wants, that we have higher natures—the intellectual and spritual, the growth of which is of greater importance. The feeding of the body

should, however, not be underrated, for it is the foundation of all higher life and should be perpetually considered. If Paul were speaking today, he would say that what we eat and drink has much to do with the righteousness, peace and joy which he once so earnestly advocated. He would say, looking through the lens of science, "I find that righteousness begins with the physical, and the right or wrong feeding of the body has much to do with the development of the mental and spiritual." Taking this view of our subject, we feel that we cannot make use of too much research, nor can we carelessly refuse to turn the light of science upon our present methods.

Too long fomentation injures the flour and makes the labor of bread-making tedious; and, if a little more yeast, together with care in keeping the dough from becoming cold and not permitting it to get too light, will lessen our labor, it certainly would be wise to adopt the method. (See last year's report.)

Science does not give us many facts, but there are several which it may be well enough for us to note. Since there is pleasure in working intelligently, in understanding the materials we handle, I will give the constituent parts of wheat, and some of the changes these parts undergo in the process of bread-making. I am indebted to the Encyclopædia Britannica and Williams' Chemistry of Cookery for much of what follows.

The grain of wheat consists of an outer husk, an embryo, and a central mass of farinaceous material. The husk is composed of several distinct layers of ligneous tissue, closely adhering to the seed and very hard in texture. In grinding, this is detached in scales and constitutes the chief proportion of bran. The seed contains gluten, starch and diastase. The grinding of the grain is the first process in the cookery of bread. The next stage is that of surrounding each grain of the flour with a thin film of water—then kneading in order to squeeze the water well between the particles. If nothing more than this was done, and such simple dough were baked, the starch granules would be duly broken up and hydrated, and the gluten also hydrated, but, at the same time, the particles of flour would be so cemented together as to form a mass so hard and tough when baked, that no ordinary human teeth could crush it; but that difficulty is overcome in the every day method of bread-making. Who invented it and when, we do not know. Its discovery was certainly very far anterior to any knowledge of the chemical principles involved.

Gluten is one of the most important properties of flour. It is the substance which renders the dough firm and of sufficient consistency to hold the gases long enough to insure a light, palatable bread. When gluten is kept in a moist state, it slowly loses its soft, elastic and insoluble condition. The gluten of imperfectly ripened wheat, or flour or wheat that has been kept in the midst of humid surroundings, appears to have fallen partially into this condition; gluten being an actively hydroscopic substance. If kept in water for a few days, it gradually runs down into a turbid, slimy solution, which does not form dough when mixed with starch. We have here the reason for keeping flour in a dry atmosphere.

Liebig's experiments show that flour in which the gluten has undergone this partial change may have its original qualities restored by mixing 100 parts of flour with 26 or 27 parts of saturated lime water and a sufficiency of reducing water to work it into dough. There are several

ways of making bread, but all are included in the two principal methods, viz.: unvisciculated and visciculated bread. Unvisciculated bread is the simplest form, under which head come passover cakes, scones, bannocks, &c.; visciculated bread is that which is rendered spongi-form by the action of carbonic acid within the dough and which is not baked hard and dry. Visciculated bread is made in three different ways: 1st. By the development of carbonic acid within the dough, through fermentation of the flour. This is the ordinary method. 2d. The mixing of dough with water previously aerated with carbonic acid. This produces the aerated bread of the late Dr. Dauglish. 3d. By the disengagement of carbonic acid from chemical agents introduced into the dough; baking powder, yeast powder, cream of tartar and soda bread come under this head.

In the making of bread we have millions of particles, each of which has to be moistened on its surface; and each, when thus moistened, becomes remarkably adhesive, and, therefore, sticks fast to all its surrounding neighbors. We require, without altogether suppressing this adhesiveness, to interpose a barrier that shall sunder these millions of particles from each other so delicately as neither to separate them completely nor allow them to completely adhere.

It is evident that, if the operation that supplies each particle with its film of moisture can simultaneously supply it with a partial atmosphere of gaseous matter, the difficult and delicate problem will be effectually solved. It is thus solved in bread-making.

As we have said, the seed which is broken up into flour contains diastase as well as starch, and this diastase when aided by moisture and moderate warmth converts the starch into dextrine and sugar. This action commences when the dough is made. This alone would only increase the adhesiveness of the mass, if it went no further, but the sugar thus produced may by the aid of a suitable ferment be converted into alcohol. As the composition of alcohol corresponds to that of sugar, minus carbonic acid, the evolution of carbonic acid gas is an essential part of this conversion. With these facts before us, this practical application in bread-making is easily understood. To the water with which the flour is to be moistened is added some yeast, and the yeast cells, which are very much smaller than the grains of flour, are diffused throughout the water. The flour is moistened with this liquid, which only demands a temperature of about 70 degrees Farenheit to act with considerable energy on every granule of flour that it touches. Instead, then, of the passive, lumpy, tenacious dough produced by moistening the flour with more water, a lively "sponge," as the bakers call it, is produced, which "rises," or grows in bulk by the evolution and interposition of millions of invisibly small bubbles of gas. This is then kneaded to effect a complete and equal diffusion of the gas bubbles; then raised till the mass becoming porous is ready to be moulded for the oven, which should be raised to the temperature of about 450 degrees Farenheit.

W. Matthieu Williams says we should not demand whiteness in bread, while, on the contrary, we should not follow the recent agitators for whole meal. He says: "If the husk, which is demanded by the wholemeal agitators, were as digestible as the inner flour, they would be unquestionably right; but it is very easy to show that it is not, and that, in some cases, the passage of the undigested particles may produce mis-

chievous irritation in the intestinal canal." He gives as his opinion that the middle course is the right one, viz., that bread should be made of moderately dressed, or "seconds" flour, rather than over-dressed "firsts" or under-dressed "thirds", *i. e.* unsifted whole-meal flour. If whole-meal flour is used it should be sifted through a meal sieve.

Liebig asserts that in certain cases the use of limewater improves the quality of bread.

Tomlinson says that in the time of bad harvests, when the wheat is damaged, the flour may be considerably improved, without any injurious result whatever, by the addition of from 20 to 40 grains of carbonate of magnesia to every pound of flour. Both of these would act in nearly the same manner, by neutralizing any acid, such as acetic, that might already exist or be generated in the course of fermentation.

ORNITHOLOGY.

OTTO BULLIS, WINNEBAGO CITY.

If I am expected to report of birds that are injurious to the horticulturist, as Prof. Lugger would of insects, I shall have little to say, as I cannot call to mind a single (native) species I should wish exterminated or its numbers reduced, not excepting that bugbear of the poultry raiser, the hen hawk.

While most species of our native birds appear as numerous as ever, the Raptores (birds of prey), that were once so common, are now seldom seen, owing I think to the hostility of everyone toward them. The hawks and owls doubtless do destroy many of the smaller and most useful insect-eating birds, with an occasional barnyard fowl; but this is more than offset by the countless numbers of gophers, field mice and similar pests which they destroy. Owing principally to scarcity of hawks and owls, and, consequently, the greatly increased number of field mice, our crop of clover seed was not half what it promised, for although the fields bloomed with unusual profusion, most of the blossoms ripened little or no seed. This I account for by the scarcity of bumblebees, so useful in transferring pollen from blossom to blossom. The scarcity of this insect is accounted for by the multitude of their deadly foes, the field mice, to be found in every field; and were our hawks and owls more numerous, field mice would not abound in such unusual numbers. Another season, if conditions remain the same, we may be obliged to import either hawks, bumblebees or clover seed; for we must raise red clover to maintain our farms and live stock on a paying basis.

As so much is to be said in favor of the persecuted hawks and owls, there can be no excuse for the wanton destruction of other species of our native birds, not even excepting the blackbirds, which in earlier days were so destructive to cornfields.

I have heard my father relate how "in the early days—'54 or '55—the settlers complained of the depredations by the blackbirds, claiming it was impossible to secure a crop of corn in Minnesota, as the blackbirds would destroy whole acres of corn while in the milk, even stripping the husks in shreds in order to obtain all the corn."

Now few farmers complain of the blackbird, not because these birds are less numerous, but the country being so well settled, the birds are dispersed over more fields, and the injury done to each field is slight.

A few years ago large quantities of quail succumbed to the intense and prolonged cold weather, but they are becoming more common now.

Heavy spring rains have covered our dry lakes with water, and once more the water fowl remain throughout the breeding season.

Large flocks of the prairie hen are at present reported from various parts of southern Minnesota, but as few are to be found here in chicken season the flocks must be considerably augmented by the addition of

other species of the grouse family that breed in more northern latitudes and are passing the winter months with us, where their food is more abundant.

I know this to be true of a flock containing 150 or over, that are to be seen each day in a small field of corn that was left ungathered to test the desirability of turning feeding stock in a short time daily, and to save expense of husking the corn.

As regards the feeding stock the experiment is a success, but I notice most of the ears of corn not taken by the stock, and that could be reached by the grouse, have little left but the cob.

One cannot lawfully shoot these grouse in winter, no matter how plump and palatable they become, but must preserve them for the city sportsmen to secure, while the person who furnishes food for them is very busy during the harvest months.

The field plover (one of the most useful birds to the prairie farmer, as it feeds exclusively upon insects), once very common in Faribault and adjoining counties, bids fair to become very rare in the near future, if steps are not taken to arrest the wholesale slaughter of them which is going on every year, especially in Martin and Jackson counties, where, I am reliably informed, hunters made a business of shooting these birds for the market, and right in the midst of the breeding season—selling the birds thus obtained to local buyers, who place them in cold storage until a sufficient quantity are obtained, when they are shipped to a New York City commission firm who exports them to foreign countries.

I would like to call the attention of this meeting to a deplorable fact, to the ornithologist and bird student, at least, and that fact is the inability of an ornithologist or any one to procure specimens, except unlawfully, for the proper study of his favorite science.

While there is a law, stating in effect that specimens of all species of our native fauna may be collected for the natural history department of our State University, as well as for exchange among other universities, there is no law to grant permits for collection of said specimens to any person, and many of our most interesting species cannot lawfully be collected at any season of the year; although many specimens of said species are to be seen at the State University.

Now I would like to learn who collected these specimens, and under whose authority. Do our lawmakers pass game laws and then deliberately infringe upon them? If so, who can blame other people for infringing upon laws they had no voice in framing, except indirectly.

Most of the older states have a law granting permits to suitable persons allowing them to collect specimens not to exceed a stated number of each species per annum, providing persons requesting a permit furnish a proper reference and bond, said permit to be granted through a committee of three or more formed for this purpose.

In my judgment we are in need of such a law, and I think there are many members of the Horticultural Society who are of the same opinion.

Such a law would not only permit those interested in the study of our native birds to secure their specimens lawfully, but also have a tendency to check the wanton destruction of our birds by thoughtless persons, as one who has taken the trouble to obtain a permit and is thoroughly interested in ornithology will do all in his power to prevent the useless slaughter

of bird life, taking only such specimens as are required for study. While at present he can scarcely compel others to respect the law, as he is very apt to be, although for a more worthy purpose, in the same boat himself.

BIRDS KNOWN TO BREED IN FARIBAULT, MARTIN, AND JACKSON COUNTIES.

OBSERVED BY OTTO L. BULLIS, WINNEBAGO CITY.

	Species.	English Name.	
1.	*Colymbus auritus*	Horned Grebe	R
2.	*Podilymbus podiceps*	Pied-billed Grebe	C
3.	*Urinator imber*	Loon	R
4.	*Larus franklinii*	Franklin's Gull	C
5.	*Sterna hirundo*	Common Tern	R
6.	*H. nigra surinamensis*	Black Tern	A
7.	*Phalacrocorax carbo*	Cormorant	R
8.	*Pelecanus erythrorhynchos*	White Pelican	R
9.	*Lophodytes cucullatus*	Hooded Merganser	R
10.	*Anas boschas*	Mallard	A
11.	*Anas carolinensis*	Green-winged Teal	R
12.	*Anas discors*	Blue-winged Teal	A
13.	*Spatula clypeata*	Shoveller	C
14.	*Dafila acuta*	Pintail	R
15.	*Aix sponsa*	Wood Duck	R
16.	*Aythya americana*	Redhead	C
17.	*Erismatura rubida*	Ruddy Duck	R
18.	*Branta canadensis*	Canada Goose	C
19.	*Botaurus lentiginosus*	Bittern	C
20.	*Botaurus exilis*	Least Bittern	C
21.	*Ardea wardi*	Great Blue Heron	R
22.	*Ardea virescens*	Green Heron	C
23.	*N. Nycticorax nævius*	Night Heron	C
24.	*Grus americana*	Whooping Crane	R
25.	*Grus mexicana*	Sandhill Crane	R
26.	*Rallus elegans*	King Rail	R
27.	*Rallus virginianus*	Virginia Rail	R
28.	*Porzana porzana*	Sora	A
29.	*Gallinula galeata*	Florida Gallinule	R
30.	*Fulica americana*	Coot	A
31.	*Philohela minor*	Woodcock	R
32.	*Bartramia longicauda*	Plover	C
33.	*Actitis macularia*	Spotted Sandpiper	C
34.	*Numenius longirostris*	Curlew	R
35.	*Aegialitis vocifera*	Killdeer	A
36.	*Colinus virginianus*	Bob-white	C
37.	*Bonasa umbellus*	Ruffled Grouse	C
38.	*Tympanuchus americanus*	Prairie Hen	C

39.	*Zeniadura macroura*	Mourning Dove	A
40.	*Cathartes aura*	Turkey Vulture	R
41.	*Circus hudsonius*	Marsh Hawk	C
42.	*Accipiter velox*	Sharp-shinned Hawk	R
43.	*Accipiter cooperi*	Cooper's Hawk	C
44.	*Buteo borealis*	Red-tailed Hawk	C
45.	*Buteo borealis kriderii*	Krider's Hawk	R
46.	*Haliae-etus lucocephalus*	Bald Eagle	R
47.	*Falco sparverius*	Sparrow Hawk	R
48.	*Asio accepitrinus*	Marsh Owl	R
49.	*Megascops asio*	Screech Owl	C
50.	*Bubo virginianus*	Great Horned Owl	R
51.	*Coccyzus americanus*	Yellow-billed Cuckoo	C
52.	*Coccyzus erythrophthalmus*	Black-billed Cuckoo	R
53.	*Ceryle alcyon*	Belted Kingfisher	C
54.	*Melanerpes erythrocephalus*	Red-headed Woodpecker	C
55.	*Colaptes auratus*	Flicker	A
56.	*Chordeiles virginianus*	Nighthawk	C
57.	*Chætura pelagica*	Chimney Swift	C
58.	*Trochilus colubris*	Ruby-throated Humming-bird	C
59.	*Tyrannus tyrannus*	Kingbird	A
60.	*Sayornis phoebe*	Phoebe	C
61.	*O. alpestris praticola*	Horned Lark	A
62.	*Cyanocitta cristata*	Blue Jay	C
63.	*Corvus americana*	Crow	R
64.	*Dolichonyx orzivorus*	Bobolink	C
65.	*X. xanthocephalus*	Yellow-headed Black-bird	A
66.	*Agelaius phoeniceus*	Red-winged Black-bird	A
67.	*Sturnella magna*	Meadow Lark	A
68.	*S. magna neglecta*	Western Meadow Lark	A
69.	*Icterus spurius*	Orchard Oriole	C
70.	*Icterus galbula*	Baltimore Oriole	C
71.	*Quiscalus quiscula*	Purple Grackle	C
72.	*Carpodacus purpureus*	Purple Finch	R
73.	*Spinus tristis*	Gold Finch	C
74.	*Choudestes grammacus*	Lark Sparrow	C
75.	*Melospiza faciata*	Song Sparrow	C
76.	*Habia ludoviciana*	Rose-breasted Goosbeak	C
77.	*Spiza americana*	Dicessel	C
78.	*Piranga erythromelas*	Scarlet Tanager	R
79.	*Progne subis*	Purple Martin	C
80.	*Chelidon erythrogaster*	Barn Swallow	C
81.	*Tachycineta*	Tree Swallow	R
82.	*Clivicola riparia*	Bank Swallow	A
83.	*Petrochelidon lunifrons*	Cliff Swallow	A
84.	*Ampelis cedrorum*	Cedar Waxwing	R
85.	*L. ludovicianus excubitorides*	Shrike	R
86.	*Dendroica æstiva*	Yellow Warbler	A
87.	*Setophaga ruticilla*	Redstart	R
88.	*Galeoscoptes carolinensis*	Catbird	A
89.	*Harporhynchus rufus*	Brown Thresher	C

90.	*Troglodytes ædon*	House Wren	C
91.	*Cistothorus palustris*	Marsh Wren	C
92.	*Parus atricapillus*	Chickadee	R
93.	*Polioptila cærulea*	Gnat-catcher	R
94.	*Merula migratoria*	Robin	A
95.	*Sialia sialis*	Bluebird	C

NOTE: The letters at the right are to denote whether the species named are common abundant. or rare.

REPORT ON ORNITHOLOGY,

BURTON T. WILCOX, HASTINGS.

In submitting a short report on ornithology, I beg leave to call your attention to my observations taken during the spring and summer of 1891. On referring to my note book, I find that the unusually open winter with its warm days brought some of our feathered friends back from their southern home as early as the 7th of January. However, they did not make their appearance again until about the first of February. I am not prepared to say whether they came to stay, or simply flew northward during a few days of warm weather, which existed about that time.

My notes show the following dates when the first individuals of a few common species were observed, and will give a comparative record of the arrival of the different kinds they embrace:

Jan. 30. American Robin, *Turdus migratorius*, Linn.
" 31. Herring Gull, *Larus argentatus*, Brüme.
Feb. 11. Cedar Bird, *Ampelis cedrorum*, Baird.
" 13. Wood Duck, *Aix sponsa*, Linn.
" 24. First Shore Lark seen.
" 26. Flock of Evening Grosbeak seen.
" 28. Found nest of Great Horned Owl containing three fresh eggs.
Mar. 10. Cooper's Hawk, *Accipiter cooperii*, Bonap.
" 11. American Crow, *Corvus americanus*, Aud.
" 13. Red-tail Hawk, *Buteo borealis*, Vieill.
" 13. Mallard, *Anas boschas*, Linn.
" 16. Shore Larks quite plentiful.
" 18. Robins quite plentiful.
" 20. Pigeon Hawks, *Falco columbarius*, Linn.
" 24. Small flocks of Mallard Ducks.
" 24. Blue Bird, *Sialia sialis*, Baird.
" 29. Blue Birds in considerable numbers.
Apr. 2. Killdeer Plover, *Ægialites vocifera*, Linn.
" 4. Meadow Lark, *Sturnella magna*, Sw.
" 5. Teal Duck, *Querquedula discors*, Linn.
" 5. Phoebe Bird, *Sayornis fuscus*, Linn.
" 6. Purple Grackle, *Quiscalus purpureus*, Bart.
" 6. Red-winged Blackbird, *Agelaius phœniceus*, Linn.
" 6. Red-bellied Nuthatch, *Sitta canadensis*, Linn.
" 8. Blue Birds building nests.

Apr. 8. Song Sparrow, *Melospiza melodia*, Baird.
" 8. Teal Ducks in large flocks.
" 9. Wild Pigeon, *Ectopistis migratoria*, Linn.
" 9. Heard a Mourning Dove.
" 9. Raven, *Corvus corax*, Linn.
" 10. Turkey Buzzard, *Cathartes aura*, Linn.
" 10. Flocks of Geese and Brant flying.
" 10. Barn Swallow, *Hirundo horreorum*, Bart.
" 10. Purple Martin, *Progne purpurea*, Boie.
" 11. Double-crested Cormorant seen.
" 12. Belted Kingfisher, *Ceryle alcyon*, Boie.
" 12. Crimson House Finch quite plentiful.
" 13. Wood Pewee, *Contopus oriens*, Cab.
" 13. Golden-winged Woodpecker, *Colaptes auratus*, Sw.
" 13. Ducks and Coots in abundance.
" 13. Wilson's Snipe, *Tallinago wilsonii*.
" 14. White-bellied Swallow, *Hirundo bicolor*, Vieill.
" 14. Red-shouldered Hawk, *Buteo lineatus*, Jar.
" 15. Am. Goshawk, *Astur atricapillus*, Wils.
" 16. House Wren, *Troglodytes aedon*, Vieill.
" 20. Semipalmated Sandpiper, *Ereuntes pussilus*, Linn.
" 20. Brown Thrasher, *Harporhynchus rufus* Cab.
" 20. Towhee Bunting, *Pipilo erythrophthal*, Vieill.
" 20. Finches and Sparrows plentiful.
" 21. Northern Phalarope, *Lobipes hyperboreus*, Linn.
" 21. Am. Bittern, *Botaurus minor*, Boie.
" 22. Cow Bunting, *Molothrus pecoris*, Sw.
" 23. Chimney Swift, *Chœtura pelasgia*, Step.
" 25. Whip-poor-will, *Antrostoinus vociferus*, Bonap.
" 25. Spotted Sandpiper, *Tringoides macularius*, Linn.
" 28. Flock of Yellow-shank Snipe seen.
" 30. Rose-breasted Grosbeak, *Guiraca ludoviciana*, Sw.
" 30. Least Sandpiper, *Tringa minutilla*, Vieill.
" 30. Cliff Swallow, *Hirundo lunifrons*, Say.
" 30. Solitary Sandpiper, *Totanus solitarius*, Wils.
May 1. Baltimore Oriole, *Icterus Baltimore*, Dan.
" 2. Red-headed Woodpecker, *Melanerpes erythrocephalus*, Sw.
" 4. Large flock of Yellow-headed Blackbirds.
" 4. Nighthawk, *Chordeiles popelus*, Baird.
" 7. Wood Thrush, *Turdus mustelinus*, Gen.
" 7. Pair of Black-throated Buntings seen.
" 7. Ruby-throated Humming-bird, *Trochilus colubris*, Linn.
" 8. Least Flycatcher, *Empidonax minimus*, Baird.
" 8. Red-eyed Vireo, *Vireo olivaceus*, Vieill.
" 9. Carolina Rail, *Porzana carolina*, Linn.
" 9. King Bird, *Tyrannus carolinensis*, Baird.
" 9. Cat Bird, *Mimus carolinensis*, Gray.
" 9. Flycatchers and Vireos plentiful.
" 10. Bobolink, *Dolichonyx orzivorus*, Linn.
" 10. Summer Warbler, *Dendroica æstiva*, Baird.
" 11. Yellow-billed Cuckoo, *Coccyzus americanus*, Bon.

May 11. Scarlet Tanager, *Pyranga rubra*, Vieill.
" 11. Am. Redstart, *Setophaga ruticilla*, Sw.
" 12. Orchard Oriole, *Icterus spurius*, Bonap.
" 13. Indigo Bunting, *Cyanospiza cyanea*, Baird.
" 14. Great-crested Flycatcher, *Myrarchus crinitus*, Cal.
" 20. Up to this time about all the birds frequenting this locality have arrived, and with few exceptions they seem to be quite as abundant as the year previous.

Now that we have completed the list of immigratory birds, let us turn for a moment and see if there are any who have the courage and endurance to withstand the cold winters of Minnesota. I find upon examination of my notes that for the past three years, 1889-90-91, we have had the following birds with us during the winter months:

Great Horned Owl, *Bubo virginanus*, Bonap.
Long-eared Owl, *Otus wilsonianus*, Less.
Screech Owl, *Scops iaso*, Bonap.
Barred Owl, *Syrnium nebulosum*, Gray.
White-rumped Shrike, *Collyrio borealis*, Baird.
Blue Jay, *Cyanura cristata*.
Bohemian Waxwing.
Evening Grosbeak.
White-bellied Nuthatch.
Downy Woodpecker, *Picus pubescens*, Linn.
Hairy Wookpecker, *Picus villosus*, Linn.
Ruffed Grouse, *Bonasa umbellus*.
Quail, *Ortyx virginianus*.
Prairie Hen, *Cupidonia cupido*.
Black-capped Chickadee, *Parus atricapillus*.

USE OF BIRDS AS INSECT DESTROYERS.

Some persons without investigation or reflection have assumed that birds consume few insects. Let them visit the museum of the Department of Agriculture and examine the contents of stomachs of birds as prepared by some of our able professors, and they will be satisfied that their favorite and principal food is animal, and that many tribes use vegetable food (fruits, seeds and etc.) simply as dessert or as a condiment.

"It is not unusual" says a well known writer, "to behold in the American seas immense troops of birds collected to prey upon those prodigious swarms of winged insects which sometimes darken the air." Swallows feed upon flies, grasshoppers, butterflies and beetles, and to protect these birds from slaughter should be the object of all interested in horticulture or any of its branches. It has been stated that the "Swift" swallow can see a fly 600 yards distant. Bradley says that a pair of swallows will destroy 3360 caterpillars for a week's family supplies. Meanwhile the flycatchers are not idle, but hunt for their prey, follow the plow for insects, glean the flies found molesting the cattle, and banquet upon the swarms that breed upon the margin of stagnant waters. Wilson says that the black-

bird will destroy fifty grubs daily; even in winter its food is in part chrysalides and spiders. A curious observer, watching the nest of a thrush, counted 206 visits to feed the young during one day. The grouse and partridge often feast their young upon an ant-hill. A family of plovers will destroy myriads of grasshopers, taking them in an early stage when no larger than flies. Owls, solemn and innocent as they look, are equal to terriers as mousers.

Among all our families of birds there are none more decidedly beneficial to the horticulturist than the Picidæ. There is not a single specie of them (with the exception of one) found in our state, against which anything can be truthfully alleged, which is not a thousand times compensated for in the direct good done by the bird in the destruction of insects. Unlike other families of birds, the woodpeckers prey almost entirely upon such insects as damage trees by burrowing through the bark or in the wood. They are constantly laboriously seeking insects in the bark of trees, one variety only being accused of boring the green bark to feed upon its juices; yet the "sapsuckers" have many friends to assert their innocence. Wrens and creepers hop from branch to branch, or creep along the larger limbs, seeking their favorite food. Jays, crows, nighthawks, and whip-poor-wills destroy immense quantities of beetles.

The robin and red-winged blackbird obtain their food almost exclusively from the ground, and quails have been seen to forage recently planted fields systematically in sections, and upon shooting a specimen no grain has been found, but mostly cut-worms and other insects.

The sparrows and finches are understood to live mainly upon seeds, but they feed their young entirely upon the larvæ of insects.

The gramnivorous birds are insectivorous in early life. A single pair of sparrows is reported to have carried to the nest five hundred insects in an hour; at that rate making about six thousand a day.

There are many birds with bad reputations in popular estimation, that are deserving of consideration instead of execration. Among these is the crow. He is well worthy of defence. He is shy and suspicious, but frequents fields and meadows, exhuming worms and larvæ with instinctive facility. His food is mainly animal and not vegetable, and he will eat but little corn at a time, however abundant. He will follow the plow for the large white grub, the larvæ of the May beetle. He is an industrious destroyer of the larvæ of the cockchafer, as is also the purple grackle, the red-winged blackbird and the meadow lark. Crows have been proscribed by state legislation, and insects have increased in proportion as the *corvus* family has been exterminated, the insects proving to be unendurable pests, while the bird is accustomed to take a moderate toll from the grain so well protected.

The blackbird, so much abused, is voracious in the consumption of grubs obtained from newly plowed ground by a dextrous practice of boring. The cherry bird is, in cherry time, voted a nuisance, but those who have observed carefully assert that he takes only those with worms in them. But this point is stoutly contested by the losers of cherries, and good evidence produced.

The woodpecker, poor drudge, ever digging for a living, unrespited and patient, does an important service for the farmer, as he drives into the wood his chisel-shaped bill, propelled by powerful muscles acting upon a

short neck, and with his long, tapering, needle-like tongue extracts his chosen morsel. The catbird, much as he is disliked for eating cherries and strawberries, is still more addicted to insect eating; and the king bird, charged with destroying bees, feeds on large flies, cankerworms and beetles. So disgusting a bird as the buzzard is very useful, and everywhere protected by law; useful not only as a scavenger, but also, it is claimed, for the destruction of mice.

The robin, coming so early in the spring, so familiar, so plump and tempting to the epicure, is often persecuted and destroyed by wanton sportsmen. He is perhaps the most useful of all our insectivorous birds, saving a valuable percentage of the farmer's crops by his timely assistance, and requiring immense quantities of insect food to rear two or three broods of young each season. He is by no means omnivorous, never eating corn, living upon insects, preferring the hard-shelled species for his own use, and reserving worms and larvæ for the juveniles of his family.

As aids to the fruit grower and gardener, for specific objects, birds sometimes have a peculiar adaptation. The flicker, or golden-winged woodpecker, has actually been seen to probe the gummy hiding places of the borer in the trunk and surface roots of the peach, and bring forth and destroy the pest. Such instances of special utility might be multiplied. While the farmer suspends his operations in winter, and comfortably occupies the chimney corner, his entomological assistant, the chickadee, reckless of the cold, prospects among the trees for insects in every crevice of the bark, and the creeper accompanying him further investigates the hidden habitation of worms.

The co-operation of the birds with the farmer is, therefore, almost uninterrupted by heat or cold, climate or season. In the brief exhibit of the practical relations of birds with man, the facts are so suggestive of evidence in the experience of all, and so germane, that further proof of their usefulness is manifestly useless.

ENTOMOLOGY.

TENT-CATERPILLARS.

PROF. OTTO LUGGER, ST. ANTHONY PARK.

The past year has been remarkable for the large number of some species of insects not usually so very abundant in our state. Among these the caterpillars of the "Tent-caterpillar of the Forest" (*Clisiocampa sylvatica*) deserve special notice, as they were found in some parts of the state in such immense numbers as actually to stop the railroad cars in several instances.

It is remarkable that these bright and showy caterpillars should appear suddenly in such vast numbers, without first becoming decidedly apparent during the spring of the previous year. Yet such was the case. During the spring of 1890 the common Orchard Tent-caterpillars (*Clisiocampa americana*) abounded near the Experiment Station, but a careful search for the allied species failed to reveal any of them, nor were any found elsewhere. It is true the differences between these two species is slight, as may be seen in the illustrations before you, yet they are sufficiently

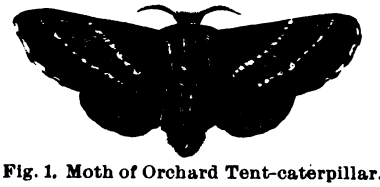


Fig. 1. Moth of Orchard Tent-caterpillar.

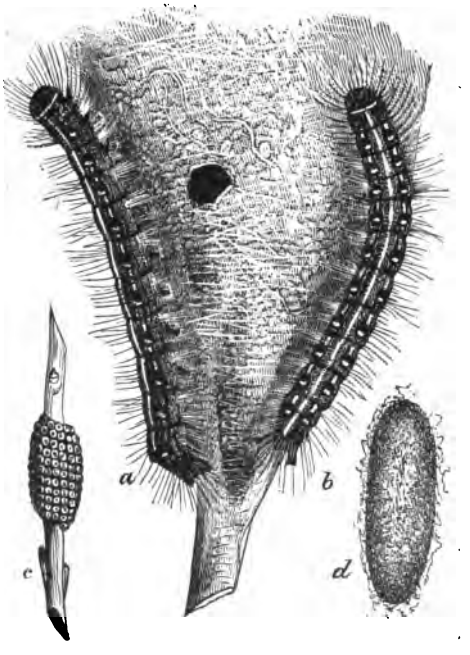


Fig. 2. Early stages of Orchard Tent-caterpillar: *a*, *b*, caterpillars resting upon tent-like nest; *c*, ring-like egg mass; *d*, cocoon.

apparent to anyone in the habit of observing such things. Moreover, the Orchard Tent-caterpillar forms large and rather regular tent-like nests upon the branches of a large variety of trees, which is not done by the Forest Tent-caterpillar, the nests of these caterpillars being made close to the trunk of the tree, nor are they so closely spun and white, and are consequently not so readily detected.

The life-history of both species is very much alike, nor do the other species of this genus of moths found in the United States and Europe differ materially. The moths fly in Minnesota early in July. After mating, the female selects a suitable twig, and around it deposits a large number of eggs, packed so closely and regularly together as to form a more or less regular ring. The egg-masses, composed of 350 to 450 eggs, are covered with a glistening coat of glue as a protection against moisture. As seen

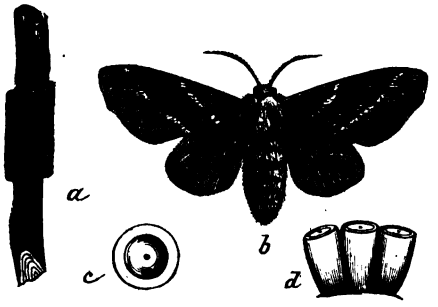


Fig. 3. Tent-caterpillar of the Forest: *a*, egg-mass; *b*, moth; *c*, egg from above; *d*, side-view of three eggs.

Fig. 4. Full grown caterpillar of "Tent-caterpillar of the Forest."

by the illustration the brownish-black egg-masses of the two species of tent-caterpillars vary somewhat in their shape. Those of the Forest Tent-caterpillar form a more uniform ring, and are squarely docked off at the ends. The eggs themselves, also illustrated, are rather pretty objects of a creamy white color, with a prominent circular rim and a sunken spot in the center. These eggs remain upon the trees until the next spring, when they hatch as soon as the first leaves unfold. Now the young caterpillars lead a happy and social life, the warm sun of spring producing ample food for them. Yet, in comparison to other caterpillars, they are modest in their demands upon food, as they do not eat constantly, but only twice and at regular intervals. If not engaged in feeding the caterpillars huddle closely together, but not exposed to the soft and balmy breezes of spring, so often fabled about by poets and so seldom experienced by other mortals, since not infrequently snow, rain, frost and heat alternate with surprising suddenness and unexpectedness. The young caterpillars do not like to expose themselves to such unstable climatic conditions. As soon as they leave the eggs they spin a silken thread wherever they move, so that the road followed by them to reach the supply of

food is always marked by a silken carpet. Soon after birth the caterpillars, huddled together as they are, form over the whole colony a silken roof with one or more openings. These openings may be compared with the narrow gates leading to a fortified city. Of course as the caterpillars grow this tent is constantly enlarged, until it becomes large enough to attract the attention of the most careless gardeners. The caterpillars leave their nest twice every day, and leave it in good marching order. I do not mean to say that—like soldiers—they actually keep step, but at all events they leave by keeping in feeling with each other. Wherever the leader goes there all the others go as well. As they grow older and larger their excursions become more extensive, the food near by being eaten, notwithstanding all the efforts of the infested plants to repair damages. When the time arrives in which to shed their old and too closely-fitting skins, an operation repeated four times, all the caterpillars retreat to their tent, under cover of which and protected by it against rain, the process of moulting takes place. At last the caterpillars have reached their full size, and the members of the colony, once so social in all their daily operations, now scatter, and each caterpillar tries for itself to find a suitable place to transform into a pupa. Soon a sheltered spot has been found. If born near fences the caterpillar will select the underside of the upper horizontal rail, and there spin a most delicate and beautiful cocoon. First fastening some loose silk to projecting parts to hold the more solid cocoon in position, this latter is formed in a most syemtrical shape and so transparent as to permit us to see very clearly all the operations of spinning going on in the inside. But soon the structure of the cocoon is filled with a sulphur-yellow powder, so that further observations become impossible. Inside this cocoon the pupal stage is reached, and a few weeks later the insect leaves it as a winged and sexual being. The form, markings and colors of the different stages of both kinds of Tent caterpillars are given upon the illustration before you. There is but one annual brood.

The difference between the two species is not great, yet constant.

The Orchard Tent-caterpillar (*Clisiocampa americana*) is found abundantly every spring. It is very partial to certain plants, prefering, besides the orchard trees, the wild cherry, plum, and haws found in Minnesota. Along the edges of our prairies the large tents of these caterpillars are a common feature during the first warm weeks of spring.

The Forest Tent-caterpillar (*Clisiocampa sylvatica*), however, is more devoted to the forest trees, though by no means disdaining fruit trees, and in years like the past one not a single kind of native trees is free from its attacks. Oaks, basswood, ash, maple, elm, boxelder, poplars and willows, are all more or less infested, nor do the smaller bushes escape injury. In extreme cases even the different kinds of evergreens do not escape entirely. As already mentioned, this species does not spin such a conspicuous nest or tent, otherwise the habits are almost identical. Nor does it always undergo its moults inside or below a tent; in many cases hundreds of these caterpillars were closely huddled together for this purpose, upon the trunk of an oak not protected by any silken covering whatever. Yet close observation showed that all rested upon a carpet of silk, and whenever a caterpillar moved it would invariably leave a fine silken thread behind, so fine as to be barely visible even with a strong magnifying glass.

In many parts of the state bee keepers suffered greatly from the inroads of these caterpillars, because hungry hordes of them removed the last trace of the flowers of basswood, a bountiful source for honey.

As a general rule the invasions by the later species do not repeat themselves so frequently, otherwise the insect would form one of our most dangerous enemies to our shade and forest trees. Of the immense numbers of caterpillars seen everywhere last spring, the great majority died in consequence of a disease, and but comparatively few escaped destruction and transformed into moths. A close inspection of the trees in several badly infested neighborhoods shows that very few eggs have been laid, so that a repetiton of the trouble during the coming spring is not likely, at least not in the inspected regions.

As to remedies we can do but very little if the caterpillars are so numerous as they were last year. It would be almost impossible to reach them with any of the arsenical poisons, and the necessary thorough application would cost too much for labor, time and material. Yet we should not permit the defoliation of the shade trees near our homes. Even without the use of any poison, a little attention and labor would have been sufficient to protect such trees. As a very general rule the caterpillars rested, closely packed together, upon the lower part of the trunks of trees infested by them, and a stiff broom will soon put an end to their further depredations. An application with kerosene emulsion was tried repeatedly, but had but little success, as the caterpillars are well protected by a velvety skin, that does not permit intimate coating with any fluid. Good pyrethrum seems to be a scarce article in our drug stores, at least the material bought as such acted more like harmless flower, than as the article it was sold for. Spraying with any of the arsenical poisons, such as Paris green, or London purple, would have been very useful, at least for valuable trees that should be protected at almost any reasonable cost. Destroying the eggs is a very feasible method upon orchard and other low growing trees, but is out of the question with forest trees. The rings of eggs are readily seen during the time that the trees are bare of leaves, and as easily removed.

Both species of Tent-caterpillars have but few enemies among the vertebrates. Birds will not eat them, with the exception of our two species of Cuckoos. The other insectivorous birds do not fancy the hairy and velvety coats of the caterpillars, and will not even make a trial. Skunks—which of course should not be classed with birds—enjoy a mess of these worms, and seem to increase their odoriferous qualities by feasting upon such food. This is at least the opinion held by my family of the particular skunk that invaded the neighborhood during the caterpillar season. Only a large beetle (*Calosoma frigida*) hunts and kills many of these caterpillars, and ought to be protected.

DISCUSSION.

Dr. Frisselle: I have no faith in paris green. I have tried it, and it has been a failure with me. The only way that I can get rid of these worms is to take a cup of kerosene and a little stick with a rag wrapped around the end of it, and go gently up

to the bush and touch each one of these worms. I have found that this will kill them dead, and it is the only thing that has been a success with me.

Mr. Smith: In order to make the paris green an effective poison, it is necessary that the caterpillars should eat it. It will do no good to sprinkle it on them.

Dr. Frisselle: I tried the experiment of sprinkling a solution of paris green on my raspberries. The worms ate the raspberries, leaves and all, and seemed to be just as well as ever. I don't know whether they ate the paris green or not, but I presume they spit it out. (Laughter.)

Mrs. Kennedy: I tried the paris green on my vines, and the worms seemed to thrive on it. I don't think that paris green will kill them.

The Secretary: I will tell you how to kill them on the plum trees. Just take kerosene oil and squirt it on them.

President Underwood: Why can't you spray raspberries in the same way?

Dr. Frisselle: Because it kills the foliage.

Mr. Harris: I had considerable experience with the Orchard caterpillar. We go over the orchard and wherever we see their eggs, we gather and destroy them. In the spring, we keep watch, and, when we see their nests in the forks of the branches of the trees, we just take a swab and some strong soap suds, or kerosene, and go over the tree two or three times. This remedy is recommended by the older entomologists. I have also killed them by powder, and by burning them in their tents.

Mr. Dartt: Rubbing a stick covered with kerosene in the fork of the tree will destroy them. I have heard of a way of killing bed bugs, that perhaps could be used for these caterpillars. There was an old soldier traveling through the country, and one day, becoming hungry, he stopped at a lady's house and asked for his dinner, telling her that in return he would give her a sure and simple remedy for killing bed bugs. After a hearty meal had been finished, he drew from his pocket some rotten wood which he crushed between his fingers, and then gave the lady the following directions: "Approach their retreat very cautiously, avoiding all unnecessary commotion, and having located a bug, by a quick and dexterous movement of the hand seize him by the shoulders and then holding him up to the light, squeeze him. If you exercise the proper care in squeezing him he will "gawp." When he

"gawps" just put a little of the rotten wood into his mouth, and that will kill him." Now perhaps Dr. Frisselle might try that plan with his caterpillars. (Laughter and applause.)

REPORT OF COMMITTEE ON ENTOMOLOGY.

BY J. S. HARRIS.

Mr. President and Members of Minnesota State Horticultural Society:

With the balance of the committee on Entomology composed of such men as Prof. Otto Lugger and R. J. Mendenhall, who have made the study and investigation of insects almost a life work, I feel much like a trespasser in forbidden fields when attempting to mention the subject of entomology. In southeastern Minnesota the year 1891 has shown a marked difference from a few of the immediately preceding years by the almost entire freedom from the presence and ravages of some of the insects most injurious to the horticulturist. The fact is, that with a few exceptions, the insect crop of 1891 was very nearly a general failure. The tent-caterpiller, which a few years since bade fair to ruin our forests and orchards, seems to have folded his tent and departed for greener fields and fresher pastures. The codling-moth did not put in its usual amount of work, and, as a consequence, the quantity of wormy apples was very much less than common. The apple gouger and plum curculio were pretty bad in some sections, but not so numerous but that we were able to find enough perfect apples and unstung plums to perfect a pretty fair crop of fruit.

There was no perceptible diminution of the first crop of currant worms; they cleaned up the farmers' bushes as usual. The red cap raspberry suffered quite severely from having the leaves eaten full of holes quite early in the season. The season was noted for the almost total absence of the May beetle, the larva of which is the white grub so destructive to the strawberry plant, and we may reasonably hope that we may have a season or two of partial exemption from their ravages.

The Colorado potatoe beetle has not been so scarce since the year it put in its first appearance, and there is a considerable stock of paris green and london purple left over unused. On my own place I saw but one perfect beetle, and scarcely any of the larvæ. The festive mosquito and the common house fly were late in putting in their appearance, and did not seem to multiply as rapidly as usual. But the brown aphis on our plum trees was a terror, so numerous were they that on many trees they did not suffer the leaves to unfold. Much of the fruit was ruined, nearly all of it was injured, and hundreds of the trees made no growth. The man who will give us a simple remedy for this pest will be hailed as a public benefactor. Will he please step forward and be introduced to this audience? The question is open for discussion.

SPRAYING FRUITS.

SPRAYING FOR INSECT PESTS AND FUNGUS DISEASES.

(U. S. Dept. of Agriculture. Extracts from Farmers' Bulletin, No. 7, 1892.)

SPRAYING FOR INSECT PESTS.

The distribution of insecticide mixtures in the form of spray was first begun in this country on a large scale during the early spread of the Colorado potato-beetle in the Western States. Paris green was first used in 1869 both as a dry mixture diluted with flour, ashes, plaster, or slacked lime, and in liquid suspension in water. Spraying machines soon came into use, and this method of application of insect-destroying mixtures was speedily extended to other insect pests. In 1878 poisoned spray was first used against the codling-moth, and the Entomologist of the Department had previously recommended this remedy for the cotton-worm and several other leaf-eating insects. During the progress of the investigation of the cotton-worm many spraying machines were developed, and from that time to the present the development of methods and machinery has been rapid, until at the present time the best remedies against perhaps the majority of our principal insect pests comprehend the application of an insecticide spray at one time or another.

INSECTICIDES USED IN THE FORM OF A SPRAY.

Kerosene emulsion.—This insecticide acts by contact and is applicable to all non-masticating insects (sucking insects, such as the true bugs and especially plant-lice and scale-insects) and also to many of the mandibulate or masticating insects, such as the apple worm or plum curculio, when the use of arsenites is not advisable. Kerosene emulsion may be made by means of various emulsifying agents, but the most satisfactory substances—and those most available to the average farmer and fruit-grower—are milk and soapsuds. In each of these cases the amount of emulsifying agent should be one-half the quantity of kerosene.

One of the most satisfactory formulas is as follows:

		Per cent.
Kerosene	gallons.. 2	67
Common soap or whale-oil soap	pounds.. ½	33
Water	gallons.. 1	

Heat the solution of soap and add it boiling hot to the kerosene. Churn the mixture by means of a force pump and spray nozzle for five or ten minutes. The emulsion, if perfect, forms a cream which thickens upon cooling and should adhere without oiliness to the surface of glass. If the water from the soil is hard or has a large percentage of lime add a little lye or bicarbonate of soda, or else use rain-water. For use against scale-insects dilute one part of the emulsion with nine parts of cold water. For most other insects dilute one part of the emulsion with fifteen parts of water. For soft insects like plant-lice the dilution may be carried to from 20 to 25 parts of water.

The milk emulsion is produced by the same methods as the above.

THE ARSENITES: LONDON PURPLE, PARIS GREEN, AND WHITE ARSENIC.

These poisons are of the greatest service against all masticating insects, as larvæ and beetles, and they furnish the most satisfactory means of controlling most leaf-feeders, and the best wholesale remedy against the codling-moth. Caution must be used in applying them, on account of the liability of burning or scalding the foliage.

The poisons should be thoroughly mixed with water at the rate of from 1 pound to 100 to 250 gallons of water, and applied with a force pump and spray nozzle. In preparing the wash, it will be best to first mix the poison with a small quantity of water, making a thick batter, and then dilute the latter and add to the reservoir or spray tank, mixing the whole thoroughly. When freshly mixed, either London purple or Paris green may be applied to apple, plum, and other fruit trees, except the peach, at the rate of 1 pound to 150 to 200 gallons, the latter amount being recommended for the plum, which is somewhat more susceptible to scalding then the apple. White arsenic does little, if any, injury at the rate of 1 pound to 50 gallons of water when freshly mixed. As shown by Mr. Gillette, however, when allowed to remain for some time (two weeks or more) in water, the white arsenic acts with wonderful energy, scalding, when used at the rate of 1 pound to 100 gallons, from 10 to 90 per cent. of the foliage; the action of the other arsenites remains practically the same, with perhaps a slight increase in the case of London purple.

With the peach these poisons, when applied alone, even at the rate of 1 pound to 300 or more gallons of water, are injurious in their action, causing the loss of much of the foliage.

By the addition of a little lime to the mixture, London purple and Paris green may be safely applied, at the rate of 1 pound to 125 to 150 gallons of water, to the peach or the tenderest foliage, or in much greater strength to strong foliage, such as that of the apple or most shade trees.

Whenever, therefore, the application is made to tender foliage or when the treating with a strong mixture is desirable, lime water, milky, but not heavy enough to close the nozzle, should be added at the rate of about 2 gallons to 100 gallons of the poison.

With the apple, in spraying for the codling-moth, at least two applications should be made, the first after the falling of the blossoms or when the apples are about the size of peas, and the second a week or ten days later. The first brood of the codling-moth lays its eggs in the flower end of the young apple, and the worms upon hatching gnaw their way into the interior of the apple, and on sprayed trees get poisoned in so doing, an infinitesimal amount being sufficient to destroy so minute a worm. The second spraying is for the purpose of destroying larvæ hatching from eggs which may be laid after the first spraying, as the arsenic is gradually washed off by rains.

For the plum curculio on the plum, cherry, peach, etc., two or three applications should be made during the latter part of May and the first half of June. The poison in this case is applied for the purpose of destroying the adult curculios, which hibernate and gnaw into the young growth of the trees, and even into the hard young fruit, before laying their eggs. The eggs are pushed under the skin so that the larvæ are not ordinarily affected by the poisoning.

In the case of most leaf-feeding insects, one should spray on the first indication of their presence.

Caution necessary in the use of these insecticides.—The relative susceptibility of apple, plum and peach has just been indicated under the head of arsenical poisons, and these remarks apply equally well to the use of the kerosene emulsions. In the case of other plants thorough experiments are still necessary, and all insecticides should be used in comparatively high dilution. Tender-leaved plants, such as melons and cucumbers, are more readily injured; while plants with firmer and smooth leaves, like the orange, are least affected. Annual plants, such as cabbages and other garden vegetables, are more susceptible than perennials; but in the case of root crops, such as beets, turnips, radishes, and potatoes, there is not the same need of caution as to damage to foliage. Damage to foliage is not shown at once, and in case of rain following an application another application should not be made for several days. Fruit trees should not be sprayed with arsenical poisons while in blossom, as there is no advantage in doing so, and honeybees are reported to be at times killed by working in the sprayed blossoms.

SPRAYING FROM THE HYGIENIC STANDPOINT.

The only insecticide sprays which are at all dangerous to use are the arsenic compounds, and even here the danger is greatly exaggerated by those not conversant with the facts. Paris green and London purple have for many years been extensively used in this country as insecticides, and a case of fatal poisoning from their use as such has never been substantiated. The only danger lies in having the poison about a farm or plantation in bulk. In the early days of the use of Paris green against the Colorado potato-beetle a great deal of opposition was developed on account of the supposed danger, and only recently the sale of American apples in England has received a set-back owing to the supposed danger of arsenic poisoning from their consumption. The question as to whether arsenic may be absorbed by the growing plant in any degree was long ago settled in the negative by the best chemists in the country. Dr. William McMurtrie, formerly chemist of the Department, in 1878 showed that even where Paris green was applied to the soil in such quantities as to cause the wilting or death of the plants, the most rigorous chemical analysis could detect no arsenic in the composition of the plants themselves. Other experiments in a similar direction by Prof. R. C. Kedzie, of the Michigan Agricultural College, confirmed these conclusions. It is safe, then, to assume that the only way in which fruit or vegetables can convey the poison to the consumer will be through the very minute quantity of arsenic left upon the edible part of the plant. Against the possibility of such an effect the following facts may be urged:

(1) It would seem at first glance that the use of an arsenical poison upon a plant like the cabbage would be very unsafe to recommend, yet Paris green and London purple are used upon this crop to kill the several species of leaf-eating worms which are so destructive to it, and an absolute absence of all danger, where the application has been properly made, has been recently shown by Prof. Gillette, of the Agricultural Experiment Station of Colorado, by the following *reductio ad absurdum:*

* * * Where the green is dusted from a bag in the portion of 1 ounce of the poison to 100 ounces of flour, and just enough applied to each

head to make a slight show of dust on the leaves, say, for twenty-eight heads of cabbage, 1 ounce of mixture, the worms will all be killed in the course of two or three days, while the average amount of poison on each head will be about one-seventh of a grain. Fully one-half of the powder will fall on the outside leaves and on the ground, and thus an individual will have to eat about twenty-eight heads of cabbage in order to consume a poisonous dose of arsenic, even if the balance of the poison remained after cooking.

(2) In case of spraying apple orchards for the codling-moth there is scarcely a possibility of injury to the consumer of the fruit. A mathematical computation will quickly show that where the poison is used in the proportion of 1 pound to 200 gallons of water (the customary proportion) the arsenic will be so distributed through the water that it will be impossible for a sufficient quantity to collect upon any given apple to have the slightest injurious effect upon the consumer. In fact, such a computation will indicate beyond all peradventure that it will be necessary for an individual to consume several barrels of apples at a single meal in order to absorb a fatal dose,even should this enormous meal be eaten soon after the spraying and should the consumer eat the entire fruit.

(3) As a matter of fact careful microscopic examinations have been made of the fruit and foliage of sprayed trees at various intervals after spraying, which indicate that after the water has evaporated the poison soon entirely disappears either through being blown off by the wind or washed off by rains, so that after fifteen days hardly the minutest trace can be discovered.

(4) In the line of actual experiment as indicating the very finely divided state of the poison and the extremely small quantity which is used to each tree, Prof. A. J. Cook, of the Michigan Agricultural College, has conducted some striking experiments. A thick paper was placed under an apple tree which was thoroughly sprayed on a windy day so that the dripping was rather excessive. After the dripping had ceased, the paper (covering a square of 72 square feet) was analyzed, and four-tenths of a grain of arsenic was found. Another tree was thoroughly sprayed, and subsequently the grass and clover beneath it were carefully cut and fed to a horse without the slightest sign of injury.

The whole matter was well summed up by Professor Riley in a recent lecture before the Lowell Institute, in Boston, in the following words:

The latest sensational report of this kind was the rumor, emanating from London within the last week, that American apples were being rejected for fear that their use was unsafe. If we consider for a moment how minute is the quantity of arsenic that can, under the most favorable circumstances, remain in the calyx of an apple, we shall see at once how absurd this fear is; for, even if the poison that originally killed the worm remained intact, one would have to eat many barrels of apples at a meal to get a sufficient quantity to poison a human being. Moreover, much of the poison is washed off by rain, and some of it is thrown off by natural growth of the apple, so that there is, as a rule, nothing left of the poison in the garnered fruit. Add to this the further fact that few people eat apples raw without casting away the calyx and stem ends, the only parts where any poison could, under the most favorable circumstances, remain, and that these parts are always cut away in cooking, and we see how utterly groundless are any fears of injury and how useless any prohibitive measures against American apples on this score.

SPRAYING FOR FUNGOUS DISEASES OF THE APPLE, PEAR, AND OTHER FRUITS.

Probably in no other country of the world is spraying for fungous diseases of fruits practiced to the same extent as in the United States. Five years ago practically nothing was known of this subject; in fact, the number actively engaged in spraying their trees, vines, etc., for such diseases as apple scab, black-rot, downy mildew and other diseases of the grape, did not exceed half a hundred, all told. Now, as a fair estimate, probably no less than 50,000 fruit growers are engaged in this work. From the Atlantic to the Pacific, and from the great lakes to the gulf, the methods recommended by the Department are practiced every year. Canada has also adopted many of the suggestions made by us, and even now Australia is actively engaged in experiments in the treatment of apple, pear, peach, and other diseases in accordance with suggestions originating with this Department.

DOES IT PAY TO SPRAY?

This question is in large part answered by the facts already given. No work that did not carry merit with it could have had such a phenomenal growth. To give a more direct answer, however, it may be stated that last season two hundred and fifty grape-growers in different parts of the country made a series of observations with a view of obtaining some definite information as to the value in dollars and cents of the recommendations made by the Department in the treatment of grape diseases. The facts reported by these men show conclusively that the actual profit to them over all expenses resulting from the treatment of black-rot and downy mildew was in round numbers $37,000. Thirteen thousand dollars of this sum was reported from the State of New York alone.

Other examples equally as striking could be given, but this is sufficient for our purpose. Of course, every one is not successful, but where failure is reported it is usually easy to locate and remedy the trouble.

FUNGICIDES, OR REMEDIES USED IN SPRAYING.

Numerous preparations have been recommended and used for this work. For all practical purposes, however, there are but four which properly may be called remedies. They are (1) Bordeaux mixture, (2) ammoniacal solution of copper carbonate, (3) eau céleste, and (4) modified eau céleste. The latest experiments indicate that the best results will follow the use of these preparations when made as follows:

1.—BORDEAUX MIXTURE.

In a barrel that will hold 45 gallons dissolve 6 pounds of copper sulphate, using 8 or 10 gallons of water, or as much as may be necessary for the purpose. In a tub or half barrel slake 4 pounds of *fresh* lime. When completely slaked add enough water to make a creamy whitewash. Pour this slowly into the barrel containing the copper-sulphate solution, using a coarse gunny sack stretched over the head of the barrel for a strainer. Finally fill the barrel with water, stir thoroughly, and the mixture is ready for use. Prepared in this way the cost of 1 gallon of the mixture will not exceed 1 cent, the price of copper sulphate being 7 cents per

pound and lime 30 cents per bushel. In all cases it is desirable to use powdered copper sulphate, as it costs but little more, and dissolves much more readily. It is highly important also that *fresh* lime be used.

It will be seen by those familiar with former suggestions made by the Department that the strength of this mixture has been diminished one-half. It was found as the result of experiments made, in 1891, that a mixture of this strength, and even much weaker, gave practically as good results as the old formula, which required 6 pounds of copper sulphate and 4 pounds of lime to 22 gallons of water.

2.—AMMONIACAL SOLUTION OF COPPER CARBONATE.

In an ordinary water pail mix 5 ounces of copper carbonate with enough water to make a thick paste. Dissolve this paste in 3 pints of strong aqua ammonia; then dilute to 45 gallons. If 3 pints of ammonia are not sufficient to dissolve all the paste, add enough to bring about this result. Copper carbonate occurs in the market in the form of a fine greenish powder. The retail price is usually 60 cents per pound. Aqua ammonia having a strength of 26° retails at 8 cents per pound. Upon this basis 1 gallon of the ammoniacal solution of copper carbonate will cost 1 cent.

In view of the fact that copper carbonate is sometimes difficult to obtain, the following directions for manufacturing it are given:

In a half barrel, or some similar vessel, dissolve 3 pounds of copper sulphate in 2 gallons of hot water. In another vessel dissolve 3½ pounds of common washing soda, or sal soda, in 1 gallon of hot water. When cool pour the second solution slowly into the first; then as soon as all action has ceased add enough water to bring the whole up to 8 or 10 gallons, and stir thoroughly. In twenty-four hours pour off the clear liquid, taking care not to disturb the sediment. Add fresh water and stir again. Again allow the solution to stand twenty-four hours, pour off the clear liquid as before; then remove the sediment, which is copper carbonate. Prepared in this way there is formed 1½ pounds of copper carbonate at an expense for materials of approximately 18 cents per pound. The copper carbonate paste may be immediately dissolved in aqua ammonia, using two gallons of the latter, or as much as may be necessary for the purpose. This concentrated fluid should be kept in well corked jugs, and when ready for use should be diluted at the rate of 1 pint to 12 gallons of water.

3.—EAU CELESTE.

Dissolve 2 pounds of copper sulphate in 8 gallons of water. When completely dissolved add 3 pints of strong ammonia and dilute to 45 gallons. Prepared in this way the solution will cost about two-thirds of a cent per gallon.

4.—MODIFIED EAU CELESTE.

Dissolve 4 pounds of copper sulphate in 10 or 12 gallons of water and stir in 5 pounds of washing or sal soda; then add three pints of strong aqua ammonia and dilute to 45 gallons. The cost will be 1½ cents per gallon.

HOW AND WHEN TO SPRAY.

It should always be borne in mind that no hard and fast rules can be laid down for work of this kind. Frequently the fruit-grower will have to use his own judgment, especially as regards the number of sprayings

and the proper time to discontinue them. If this be not done, serious results may follow. In the treatment of black rot of the grape, we have known vine-growers to continue the application of Bordeau mixture through a protracted drought up to the time of ripening of the fruit. As a result, when the time arrived to send the grapes to market, they were so badly spotted with the mixture that no one would buy them. Again, we have found fruit-growers thoroughly imbued with the idea that the only proper way to spray was to rush through an orchard or vineyard with some new-fangled complicated machine, applying the solutions in daubs at one point and omitting whole trees or blocks of vines at another. Such work is to be regretted, as it may be the cause of much loss to those who have acted carefully and intelligently in the matter. For example, in the case of the grape scare in New York City the past summer, grape-growers all over the country were made to suffer, partly through the folly of a few overzealous individuals who upon their own responsibility made more applications than were necessary, and partly through the action of a somewhat hasty Board of Health.

Before taking up the subject of treatments proper, it may be well to emphasize the importance and necessity of using the right kind of machinery. A sprayer, to be effective, requires first of all a good strong force pump. Next in importance is a nozzle that will throw a mist-like spray and will not clog when thick fluids are used. There are plenty of machines on the market filling all these requirements. For convenience they may be divided into three classes: (1) horse-power automatic machines, (2) machines drawn by horse power, but operated by hand, and (3) hand machines. All belonging to the first group may be dismissed with the statement that they are unnecessarily expensive and complicated, and will not, even in the most careful hands, do the work as thoroughly and effectively as the machines belonging to the second and third groups. Of the second group, in which the cheapest, most practical and efficient example is found in a strong, light, double-acting, double-discharge force pump mounted on a barrel, it may be said that while they cannot do the work as rapidly as the machines of the first class they are more effective, much cheaper, and far less wasteful of the liquid used. To the third class belong the knapsack sprayers, which are the only ones necessary to notice in this connection. There is no question that for all moderately low-growing crops the knapsack sprayer fills every requirement. In no other machine is the work so absolutely at all times under control, it being possible to place nearly every drop of liquid exactly where it is wanted. Knapsack pumps are now used in many moderate-sized vineyards; also in places where the horse-power apparatus, owing to the nature of the land or the manner of cultivation, cannot be utilized.

Many firms throughout the country, as will be seen by reference to the columns of any good agricultural paper, are engaged in the manufacture and sale of the various machines mentioned.

Taking up the question of spraying more specifically we would call attention first to apple diseases and their treatment.

TREATMENT OF APPLE SCAB.

For this disease either modified eau céleste or ammoniacal solution of copper carbonate, preferably the former, may be used. At least four

sprayings should be made, the first just as the flowers are opening, the second twelve or fourteen days later, and the third and fourth at similar intervals. In case the season is wet, one or two additional treatments will undoubtedly pay. For trees 15 to 18 feet high the cost of four sprayings with either of the fungicides mentioned need not exceed 20 cents per tree. When the work is done on a large scale, 16 to 18 cents per tree will cover the cost of four treatments. Two additional treatments will add to the cost from 6 to 8 cents per tree.

APPLE POWDERY MILDEW.

It is only in nurseries that this disease is destructive. Seedlings are especially subject to the mildew, the leaves being attacked as soon as they appear. As a result the trees make very little growth, are bark bound, and consequently unfit for budding. The ammoniacal solution has proved the cheapest and most effective remedy for this disease, and five sprayings seem to be required. The first application should be made just as the leaves start in spring. At least three other sprayings should be made at equal intervals between the time of the first treament and the time for budding. Ten or twelve days after budding the last spraying should be made, making five in all. For blocks of 50,000 to 100,000 seedlings the total cost of the treatment, as indicated, need not exceed 8 cents per thousand. In smaller blocks the average cost per thousand trees will be somewhat greater, as it requires practically as much time to prepare to spray 25,000 trees as it does 50,000. The knapsack pump is well adapted to this work and is extensively used by nurserymen. Larger machines designed to be drawn by a horse have been described by us in Circular No. 10 of the Division of Vegetable Pathology.

TREATMENT OF LEAF-BLIGHT OF THE CHERRY, PLUM AND QUINCE.

This disease, which seriously damages the trees both in the nursery and orchard, may be readily held in check by the proper use of either Bordeaux mixture or the ammoniacal solution. In the orchard and nursery, the directions laid down for the treatment of pear scab, cracking, and leaf-blight are applicable here.

TREATMENT OF BLACK-ROT OF THE GRAPE.

Method A.—After pruning the vineyard and putting the ground in thorough order, spray the vines first, as the buds begin to swell, with Bordeaux mixture. When the leaves are one-third grown make a second application of the same fungicide, following with a third when the vines are in full bloom. After this, applications should be continued at intervals of ten or twelve days until the first signs of ripening are noticed. This will usually be three weeks or a month before the grapes are ready to pick. In no case should the treatments be continued up to the time of harvest, as this is entirely unnecessary; moreover, it is sure to render the fruit unsightly. It is important to bear in mind that, in case of dry weather, the sprayings should cease.

Method B.—Follow the direction laid down under method *A*, with the exception that the ammoniacal solution be used instead of Bordeaux mixture.

Method C.—For the first three sprayings use the Bordeaux mixture, then substitute the ammoniacal solution for the rest of the season.

The cost of the treatment as laid down in method *A* need not exceed 2½ cents per vine. Method *B* will cost 2 cents and method *C* the same.

So far as efficacy is concerned there is little choice. All things considered, however, method *A* will doubtless prove the most satisfactory.

DOWNY MILDEW OF THE GRAPE.

When this disease occurs alone, ammoniacal solution or modified eau celeste may be used. The first spraying should be made when the fruit is well formed, the others at intervals of ten or twelve days as recommended for black-rot. What is known as brown-rot is caused by the fungus of downy mildew. It is seldom that brown-rot occurs in the berries without the leaves being also effected. In regions where this happens, the treatment recommended for black-rot should be followed.

In some sections eau celeste has been more effective against these diseases than any of the other fungicides. This is notably the case in northern Ohio and western New York. Eau celeste, however, sometimes injures the foliage, and we do not advise its extended use.

ANTHRACNOSE OF THE GRAPE.

Use Bordeaux mixture the same as recommended for black-rot under method *A*.

USE OF COPPER COMPOUNDS FROM A HYGIENIC STANDPOINT.

Ever since the copper compounds came into general use as fungicides the question as to their effects, hygienically considered, has received more or less attention. With the exception of the New York City Board of Health, no positive stand on this question has been taken, so far as we are aware. Many vague and misleading statements, however, have from time to time appeared in the horticultural and agricultural papers. Every one familiar with the situation understands why these rumors, for such they can only be considered, are sent out. They are not aimed particularly at the practice of spraying, but are simply efforts on the part of selfish competitors to cripple the legitimate trade of more energetic and wide-awake rivals.

We take the ground that fruit sprayed with the copper compounds in accordance with the directions of the Department is harmless. No better proof of this is to be found than that shown by the experience of this country. For five years the copper compounds have been used by hundreds and thousands of fruit-growers in every part of the United States, yet in all that time not a single authenticated case of poisoning, so far as we are aware, has been brought to light. It is true a few individuals have claimed that they were made sick by eating sprayed fruit, but in all such cases careful investigations have revealed that claims of this kind were absolutely without foundation. However, we do not consider these general statements sufficient to warrant us in taking the stand as regards the harmlessness of the copper compounds when properly used. More direct testimony is readily obtained and some of this we now propose to consider. The question may properly be discussed under two heads namely:

(1) The present condition of our knowledge as regards the toxicology of copper; and

(2) Are the salts found in sufficient quantity upon the fruit at the time of harvest to prove injurious to health?

No doubt the majority of people, including physicians, would answer the first statement at once by saying that copper is a poison. When we come to look carefully into the matter, however, it is found that the very best authorities differ on the subject. For more than a hundred years the question as to the poisonous nature of copper has been discussed, and yet, after reading all the testimony, it is exceedingly difficult from the evidence adduced to form a definite opinion.

In 1885 the question was discussed before the Belgium Royal Academy of Medicine for seven months, the object being to obtain some authoritative data as to the effect of copper contained in French canned vegetables on the public health. While it was finally decided that the copper compounds in foods were harmful, no direct stand as to the poisonous nature of the substances was taken. Those who antagonized the view that copper was an actual poison cited many eminent authorities to bear out their assertions. In the whole discussion, however, it was remarkable that not a single case of injury to health, resulting from the daily absorption of small quantities of copper, was given. Many instances were cited, however, where foods containing copper in considerable amounts were daily consumed without any ill effects whatever. It is interesting to note in this connection that, notwithstanding the discussion before the Belgium Academy, the law of July 1882, prohibiting the use of copper in the re-greening of fruits, was repealed by the French authorities in the Department of the Seine. It appears, therefore, from all the evidence on the subject that the question under consideration is not settled by any means. For this reason, alleged cases of poisoning with copper should receive the most careful investigation.

We presume no one will deny that copper in large or even moderate doses is unwholesome. Looking at the question from this standpoint let us consider the second part of our subject, *i. e.*, are the salts found in sufficient quantity in connection with properly sprayed fruit at the time of harvest to cause injury to health? At this point it may be well to add that all our remarks apply to the Bordeaux mixture, which contains about twenty times as much copper as the ammoniacal solution, the only additional fungicide worthy of consideration on account of its extended use.

According to Gauthier, professor of chemistry of the faculty of medicine, Paris, an adult can absorb daily for a period of several weeks without ill effects from 0.2 to 0.5* gram of copper sulphate, or blue vitriol. Five-tenths of a gram is usually considered the maximum amount that may be absorbed for any length of time without injury to health, although cases are on record where as high as 2, 3, and even 4 grams have been absorbed for a number of days in succession without any ill effects whatever. Some recent French investigations have shown that a dog can absorb from 15 to 25 grams of copper sulphate without injury. Sheep have been fed 43 grams per day for several days in succession without any noticeable derangement of the system.

At this point we are confronted with a somewhat complex chemical question which makes it difficult to obtain results strictly comparable.

*1 gram equals 15.438 grains.

The Bordeaux mixture, as elsewhere shown, is made by the addition of lime to a solution of copper sulphate. According to recent investigations, the reaction is an exceedingly complicated one, the details of which are unnecessary here. It has generally been accepted that the mixture as sprayed upon the vines consists for the most part of copper hydrate, which upon drying becomes an insoluble compound. We have, therefore, first of all, the question to consider whether the hydrate is as likely to prove injurious to health as the sulphate in solution. No direct investigations upon this point have, so far as we know, been made. It has been shown, however, that doses of copper four to five times greater can be administered in an insoluble than in a soluble state. The question now briefly stated resolves itself into this: May we, without assuming too much, use the facts bearing on the harmfulness or harmlessness of copper sulphate when considering copper hydrate and copper oxide? We believe that this assumption is not only admissible but is erring upon the safe side; in other words, that, if an adult can safely absorb 0.5 gram of copper sulphate a day without injury, he may with much less fear of ill effects absorb the same quantity of copper hydrate and copper oxide. In fact, as regards the ill effects of the latter, hygienically considered, there is a great deal of evidence which will be considered later.

Accepting, then, the 0.5 gram as the maximum amount of copper in any of the forms discussed that may with safety be daily absorbed, let us see how these figures compare with the quantity of this metal found in connection with properly sprayed fruits as well as some other foods and drinks. Analyses to determine the amount of copper on sprayed grapes have been made in Germany, France, America, and other countries. The results of all these show that grapes sprayed intelligently rarely contain more than 5 milligrams (0.005 gram) of copper per kilogram, the average being from 2½ to 3 milligrams per kilogram. In other words, 1,000,000 pounds of grapes sprayed in the usual way with the Bordeaux mixture would contain from 2½ to 5 pounds of copper. To reduce the figures still further, each 1,000 pounds of fruit would contain 17.5 to 35.0 grains of copper. On this basis an adult may eat from 300 to 500 pounds of sprayed grapes per day without fear of ill effects from the copper. This shows how ridiculously absurd are the statements that fruits properly sprayed with the Bordeaux mixture or any other copper compound are poisonous.

Turning our attention to another phase of the subject, let us consider some other articles of food and drink in no way connected with spraying. In the first place, it has recently been shown that grapes which have never been treated with any fungicide may contain as much as 2 milligrams of copper per kilogram, two parts in a million, or practically the same as the average amount found in connection with sprayed fruit. Finding copper, therefore, in connection with fruit is no indication that such fruit has been sprayed with the copper compounds. Perhaps, if this fact is remembered in the future, it may prevent hasty conclusions and consequent annoyance.

According to numerous analyses, wheat may contain from 4 to 10 milligrams of copper per kilogram, the average being 7.2 milligrams per kilogram. The United States exported to Europe and other foreign countries in 1890, 54,387,767 bushels of wheat, weighing approximately 3,263,266,020

pounds, or 1,480,217,466 kilograms. If each kilogram of wheat contained 7.2 milligrams of copper, then there were 10,657 kilograms, or 23,495 pounds, of this metal sent out of the country in wheat alone. In the face of these figures, we do not see how any foreign country can logically object to American fruits on the ground that they contain copper, without also objecting to wheat.

Wheat, however, does not contain anything like as much copper as some other foods and drinks. Beef and sheep liver, according to reliable and repeated analyses, contain, respectively, from 56 to 58 and 35 to 41 milligrams of metallic copper per kilogram of fresh substance, while in chocolate the enormous amount of 125 milligrams to the kilogram has been found. In conclusion, it is only necessary to call attention to one other matter to show how unjust and discriminating it would be to condemn American fruits on the ground that they contain copper in unwholesome quantities. Brief reference has already been made to the re-greening of vegetables, as practiced by the French. Peas, beans, cucumbers, and similar products are plunged for eight or ten minutes in a solution of copper sulphate, in order to fix the natural green coloring matter. After removing the vegetables from the copper sulphate solution, they are washed in pure water and placed in jars containing a solution of common salt, sealed and sterilized by heat.

The analyses of such vegetables show that they contain copper in considerable quantity, as will be seen by consulting the table below:

Table showing copper in 1 kilogram of re-greened canned vegetables.

Vegetables.	Authority.	Amount of copper.
		Milligrams.
Peas	Galippe	48 to 60
do	Carles	70 to 210
do	Gautier	11 to 125
Beans		49 to 99
Cucumbers	Magnier	2
Tomatoes	Sestini	50 to 354

It appears from the foregoing that vegetables re-greened by the copper process may contain from two to sixty times as much of the metal as sprayed grapes. In other words, if 1,000,000 pounds of sprayed grapes contain 5 pounds of copper, 1,000,000 pounds of re-greened vegetables would contain from 38 to 150 pounds of the metal. Great Britain imported over 14,000,000 pounds of canned vegetables from France in 1890, and it is safe to say that these vegetables contained more than twenty times as much copper as all the sprayed fruit in the United States combined.

OBITUARIES.

DR. H. B. TRAIN.

DIED AT HOKAH, MINN., JULY 28, 1891.

Died at his home in Hokah, Houston Co., Minnesota, Tuesday, July 28, 1891, after a long illness, Dr. H. B. Train, aged 66.

The deceased was born in St. Lawrence Co., New York, April 26, 1825; came to Wisconsin in 1845, to Minnesota in 1856, and settled permanently in Hokah in 1857. He was a devout Christian and temperance worker He first chose as a profession the preaching of the gospel but owing to a throat difficulty had to abandon it. He next turned his attention to the study of medicine and entered upon its practice on his arrival in Minnesota. He succeeded in building up a good practice and was the trusted family physician in nearly every household in the village of Hokah and surrounding country until his own ill health compelled him to retire from practice. He was an enthuastic lover of horticulture and devoted his leisure hours to experiments in fruit culture, and was always noted for having the earliest and best garden and small fruits in the country. His large garden contained a considerable number of apple trees that for many years produced abundant crops of the finest fruit. He also improved every opportunity to encourage his neighbors to plant and care for fruit. His orchard was badly killed out in the winter of 1872 and '73,and again in 1884 and '85, but his faith in the final success of the apple in this state never wavered. He became a member of this State Horticultural Society in 1885, but since that time his health has permitted no active horticultural work..

He was twice married. The second wife and two children of the first survive him. A useful and beloved friend, he will long be remembered by those who knew him.

O. F. BRAND.

GEORGE DORRANCE.

DIED AT WALCOTT, MINN., NOV. 11, 1882.

The subject of this, Mr. George Dorrance, was born at Middlebury, Vt., December 28, 1814. From sixteen to twenty-one years of age he served an apprenticeship of five years at the carpenter and joiner's trade. Having attained his majority, he came to Green Bay, Wis., in September, 1835, and assisted at the mission station of the M. E. Church for the Six Nation Indians. In 1841, he married Miss Etherlinda Lee, who was also a missionary. That year he located in Rock County, Wis., where he lost his wife in 1850, who died leaving two children, the eldest of which survives. December 31, 1853, Mr. Dorrance was married to Miss Hannah M. Putman, who still lives on the old homestead,in the town of Walcott, Rice County, Minnesota, it being in the extreme eastern edge of the Big Woods, where they located in Aug.,1854. It was at that time an unbroken wilderness, unsurveyed, and still the hunting ground of the Sioux Indians. The intention

of Mr. Dorrance was to take part prairie and part timber, but the survey which soon followed made it all timber. In a year he had ten acres ready for cultivation. About 1857 he planted an orchard of 900 apple trees, among which were six Duchess of Oldenburgh. For that one act in the life of Mr. Dorrance, his memory should be perpetuated by a grateful people, for it was from one of those six Duchess that the Peerless apple tree sprang. The winter of 1872-73 killed all but the six Duchess, some of which still live.

There are but few people in this state who have spent so much time and money to grow apples as Mr. Dorrance did, and although his losses in the cause of horticulture were heavy, still he never gave up. He lived and died a tree missionary; and it may truly be said of him, that the world is the better for his having lived. He died on the farm he had redeemed from the wilderness, November 11, 1882.

Mr. Dorrance took an active part in our January meeting of 1868. His remarks were listened to with much interest, and his success gave much encouragement to all present.

"I shall one day stand by the water cold.
And list for the sound of the boatman's oar;
I shall watch for a gleam of the flapping sail,
I shall hear the boat as it gains the strand;
I shall pass from sight with the boatman pale.
To the better shore of the spirit land;
I shall know the loved who have gone before.

O. F. BRAND.

CHARLES WILLIAM GORDON.

DIED AT LONG LAKE, MINN., SEPT. 27, 1891.

Chas. W. Gordon was of Scotch-English ancestry and born at Spice Land, Indiana July 2, 1830. When but 9 years of age, his father died. At 17 he was apprenticed to a cabinet maker with whom he worked three years. April 15th, 1852 he was married to Miss Elizabeth Stubbs. In 1856 he came to Minnesota. April 13, 1864 he enlisted in Co. F, 11th Minn. Inft. Discharged June 26, 1865. Was a charter member of Gordon Granger Post at Long Lake and commander of the post at the time of his death, Sept. 27, 1891. He was buried at Long Lake with G. A. R. honors by his post assisted by J. B. Wakefield Post. After years of extreme suffering, his first wife died in 1884. By her he was the father of six children, four of whom survive him, viz., Mrs. M. A. Lockwood, Mrs. Diadama Carr, Mrs. Sybil Coleman and Mrs. Ester I. Gray. In December, 1887 he was married to the widow of Alonzo Coleman, her maiden name having been Drusilla Allen, a lady of sterling worth, who survives him. For a few brief years she was in every true sense the partner of his joys and his sorrows.

As recorded by Mr. Gordon on page 188 of our report for 1891, he began in earnest to grow apples in 1865, and, although a poor man during all the past years, his faith never failed, and the beautiful young orchard of 700 bearing trees, which he left as evidence of his faith, is probably the best in Hennepin County. He joined our society in January, 1891, and was at once recognized as a valuable member, with whom in sadness we part.

After long years of arduous toil in battling against adverse circumstances, he had just reached a period where he would soon reap a rich harvest

for his years of toil. But it was not to be. Over exertion, Sept. 27th last, in lifting a mired cow from a marsh, produced an internal injury—before the midnight hour he had passed into the great unknown, and we trust to an eternal rest. 'Mr. Gordon was a man who always had the courage of his convictions. An indefatigable worker in the cause of temperance, he neglected no proper occasion to deal a blow at all enemies of humanity. Untiring and outspoken for the right, as given to him to see the right, his life was shaped by his early training amid the society of Friends. It was remarked at his grave that he had no enemies.

Truly a good man has gone from our midst.

"They died—Ay! they died; and we things that are now,
Who walk on the turf that lies over their brow,
Who make in their dwellings a transient abode,
Meet the changes they met on their pilgrimage road.

Yea, hope and despondency; pleasure and pain,
Are mingled together in sunshine and rain;
And the smile and the tear, the song and the dirge,
Still follow each other like surge upon surge.

'Tis the wink of an eye, 'tis the draught of a breath,
From the blossom of health to the paleness of death,
From the guilded saloon to the bier and the shroud,
Oh, why should the spirit of mortal be proud?"

O. F. BRAND.

EX-SECRETARY JAMES W. HARKNESS,

DIED AT FARIBAULT, MINNESOTA, MARCH 24, 1871.

(*See frontispiece.*)

The subject of this sketch was one of the original little band who organized this society at Rochester on the evening of October 4, 1866. At the first regular meeting of the society at the same place, October 4, 1867, Mr. Harkness acted as secretary, pro tem, and was at that meeting duly elected corresponding secretary. In this position, the largest and most laborious work of the young society devolved upon him. It was largely owing to his energy and zeal for the cause he loved that our society soon became known among those of our sister states as the peer of any.

The following tribute to his memory appeared in the Faribault Republican, shortly after his death:

"James W. Harkness, was born in Peoria County, Ill., Oct. 6th, 1839. When a lad he removed with his parents to Wisconsin, and with them to Minnesota in 1856. He was a man of emphatic western type. When he came to our town four years ago without acquaintances, money, credit or name, without a foot of land upon which to plant his first tree, he announced his purpose to establish here the dream of his boyhood, a pioneer nursery, which should be an honor to its founder and a credit to the place. To us wise ones who knew his want of means, the scheme seemed chimerical, and we have never ceased since to wonder at the tireless and resistless energy with which he threw the whole weight of his being into his enterprise. Renting in the choicest location the highest priced land, tra-

versing a state to its remotest borders in quest of statistics, cions and choice specimens of fruit; exhibiting them at every fair and public place accessible; organizing societies and suggesting fruit shows and special legislation for tree planting and forest culture; laying his hand upon the State Horticultural Society, and breathing into its nostrils the breath of life; doing in its behalf at times the triple duties of statistical and corresponding secretaries; preaching wherever he went the new gospel of fruit growing to the masses harboring utter distrust of success, and infusing faith and enthusiasm into a gainsaying people; and amid all encountering such financial difficulties as might well appall the stoutest heart—he has taught us a new lesson of the capabilities of the man of *faith and will.* Mr. Harkness was a man of simple and economical habits, never indulging in the least personal luxury. He was also strictly honest. His greatest trial was his inability to meet his liabilities as they fell due. He is gone, but his successful life is ours. When the fruits from our gardens gladden our eyes; when the shade trees he has planted around our homes rustle their chimes; when the flowers he loved distill their fragrance for our pleasure—let us remember the virtues of our friend: and let the young men listlessly sauntering about our streets from year to year, waiting for the clouds to pour fortune upon their heads, compare their lives with his."

Mr. Harkness, was united in marriage at Owatonna, July 15th, 1870, to Miss Mary C. Christianson, now Mrs. Casper Sands, of Crookston, Minn.

O. F. BRAND.

JOHN A. SALZER.

DIED AT LA CROSSE, WIS., JAN. 22, 1892.

John A. Salzer, the well known florist and seedsman of La Crosse, Wis., died at his home in La Crosse, after a lingering illness of Bright's disease and an attack of la grippe, January 22, 1892, in the 69th year of his age.

Mr. Salzer was born in Dettinger, Germany, Dec. 8, 1823, spending his earlier years working in his father's nursery where he became a skillful propagator of trees and acquired a great fondness for flowers. He came to America in his twenty-third year and settled at Galena, Ill. He located in La Crosse in 1866, where he soon after built the first greenhouses and laid the foundation of the present business, the John A. Salzer Seed Co.—of which, he is president and largest shareholder—and giving his whole time to the growing department of this largest commercial florist and seed business in the Northwest. Mr. Salzer was greatly esteemed by all who knew him as an energetic man of sterling integrity, never compromising conscience in any walk or business of life. For many years he was a German Methodist preacher of the gospel, and he organized and gave substantial aid to a number of churches. He was liberal and unostentatious in his gifts to the poor, and toward the support of orphan asylums, homes for the aged, etc. He leaves three daughters and four sons to mourn his loss. Thus a good man has gone to his rest. His works remain with us, and the horticulture of the Northwest has been greatly advanced by his precept and example.

J. S. HARRIS.

RICHARD P. LUPTON.

DIED AT EXCELSIOR, MINN., MARCH 12, 1892.

Richard P. Lupton was born near Richmond, Ind., Feb. 12, 1845, and died at his home near Excelsior, Minn., March 12, 1892, leaving a wife and four children, the eldest 12 years of age.

Mr. Lupton spent the earlier years of his life in Iowa, removing to Minneapolis in 1874, where he engaged in business until he moved on to his farm near Excelsior about five years since, where he followed market-gardening and the culture of small fruits, taking much pride and pleasure in the same. Though never robust he was full of energy. He took much interest in the proceedings of the State Horticultural Society, of which he was a member. Mr. Lupton was a devoted member of the Friends' church and a strong advocate of temperance, having been a total abstainer from liquor and tobacco all his life, and a member of the Prohibition party since 1878, it being his fond hope to live to see his country free from the thralldom of strong drink.

ISAAC GILPATRICK.

DIED AT MINNEAPOLIS, MINN., MARCH 3, 1892.

ISAAC GILPATRICK was born in Limerick, Me., June 9th, 1827, and died in Minneapolis, March 3d, 1892. He was next to the youngest in a family of twelve children. At the age of sixteen he went to Massachusetts, and worked in a market garden near Boston until 1849, when he came to Minnesota, and at once found work in a sawmill in St. Anthony. For some years his winters were spent in the woods, lumbering, and his summers in breaking land; and in both occupations he was very successful. Some thirty years ago he became associated with J. B. Bassett in the lumber business, and it was always with much satisfaction that he could look back upon those twenty years of partnership, and think that there had never been any unkind word or thought or act between himself and Mr. Bassett. Although a wise forethought and good business habits had secured a competency, yet during the last years of his life, that he spent in his comfortable home, the force of habit and natural inclination made him one of the most industrious of men, and he could be found, early and late, busy in his garden or with his poultry; and it was probably this remarkable industry, this constant occupation of body and mind, that enabled him to ward off disease and thus prolong his life.

Mr. Gilpatrick was a man of the most thorough honesty and the kindest heart, which was always prompting him to do deeds of kindness for others; and he never was so happy as when he could be helpful to some one, by counsel or advice or some act requiring personal sacrifice. He had the faculty of attaching friends to himself to a remarkable degree, and it was almost invariably the first remark when spoken of by his friends, that "he was a good man." Few men could be taken from any community and leave such a sense of personal loss.

Of Mr. Gilpatrick's connection with the Hennepin County and the State Horticultural societies, the writer has little personal knowledge beyond

the fact that he was much interested in their transactions, but from his own success in that direction, he must have been a valued member.

The disease which terminated Mr. Gilpatrick's life, and the cause which produced it, was of a peculiarly aggravating nature. Over forty years ago, while helping pull stumps in Massachusetts, the man who was assisting, and who was under the influence of liquor at the time, started up the horses, against Mr. Gilpatrick's warning, before everything was properly adjusted, breaking a log-chain, which flew back and struck Mr. Gilpatrick on his head near the temple, fracturing the bone. This was a constant source of trouble to him ever after. Four years ago it developed into a sore of a cancerous nature. It was hoped, at one time, that this could be cured by the Koch lymph treatment, and, although it undoubtedly prolonged his life for some time, yet it did not prove the effectual remedy he thought it would at one time.

Mr. Gilpatrick had been twice married, and had had four children. His wife and two children, a son and daughter, survive him.

C. R. NEWCOMB.

BIOGRAPHIES.

EX-PRESIDENT A. W. McKINSTRY, FARIBAULT, MINN.
A BIOGRAPHICAL SKETCH.

(*See frontispiece in Report of 1891.*)

Archibald W. McKinstry was born in Chicopee, Hampden County, Mass., March 19, 1828. His ancestors on the paternal side were Scotch-Irish, and on the maternal, English. His grandfather, Daniel Williams, on the mother's side, was a revolutionary soldier, who was wounded in the battle of Stillwater. Archibald W. attended the common school in winter and worked on the farm in summer till he was 16 years old, when he went to Fredonia, Chatauqua County, N. Y., and entered as an apprentice for four years in the office of the Fredonia *Censor*, published by his brother. During the time he attended one term in the Fredonia Academy. At the end of his apprenticeship he worked as a journyman in the office of the Albany *Evening Journal*, and subsequently in book and job offices in Boston, Mass. In 1850 he returned to Fredonia and purchased an interest in the Fredonia *Censor*, which he conducted in connection with his brother till the fall of 1865, when he removed to Faribault, Minn., and purchased the Faribault *Republican*, which he has continued to conduct, as editor and publisher, to the present time. In 1857 he married Ellen E. Putnam, in Fredonia, N. Y., by whom he had two children. He has ever manifested an active interest in agricultural and horticultural pursuits, and was elected the second president of the Minnesota State Horticultural Society, October 4, 1867, and was recording secretary of the same society in 1872. He is also one of the original incorporators of the association. In 1876–7 he served one term as a member of the Minnesota House of Representatives. He served many years as secretary and treasurer of the Faribault Gas Light Company, and is a director in the First National Bank of Faribault.

EX-PRESIDENT JOHN S. HARRIS, LA CRESCENT, MINN.
A BIOGRAPHICAL SKETCH.

(*See frontispiece.*)

Through the medium of the agricultural press, the reports of the Minnesota, Wisconsin and other state horticultural societies and the American Pomological Society, the name of John S. Harris, La Crescent, Minn., has become familiar to all the people of the Northwest who take an interest in horticulture, pomology, forestry or anything pertaining to progressive agriculture.

Mr. H. was born in Seville, Medina County, Ohio, August 17, 1826. He is a descendent of a family that has always maintained an honorable record as agriculturists and artisans, that class and rank upon which the strength, stability and perpetuity of our country's institutions rest, and with patriotism and loyalty to those institutions, that enabled them to make any sacrifice in their defense. His ancestors were among the founders and defenders of this republic, and his parents, Samuel Harris of Connecticut and Mabel Gibbs of Massachusetts, were among the hardy pioneers who felled the forests of northern Ohio to carve out farms and homes and lay the foundations of the present prosperity of that great state. His father was a thorough and practical farmer, and an enthusiastic pomologist and gardener. At a very early age the lad, John S., exhibited a great love for horticulture, and, under his father's instruction and a diligent study of the meager horticultural literature that found its way to western homes in that early day, soon became a skillful propagator of trees and plants, and at the early age of 11 years started and managed a nursery and garden of his own. He remained upon the farm until the death of his father in 1844, when, following the advice of his guardian, he served an apprenticeship to learn the cabinet maker's trade; but during that time improved every opportunity to practice his favorite pursuit.

In the spring of 1847, he enlisted as a private in Company "H," 15th U. S. Infantry, to serve in the war with Mexico; went forward with his regiment, joined Gen. Scott at Pueblo and was with him in the campaign that resulted in the capture of the city of Mexico. After his return from Mexico he remained in Ohio about one year, then took a trip west and, making his headquarters in Walworth County, Wis., spent much time in traveling over Wisconsin, northern Illinois and Iowa, at that time a new and sparsely settled country, making long journeys on foot, often with no companion except a faithful dog and trusty rifle, the object being to recover his health which had been badly wrecked in the hardships and privations of the Mexican campaign. In the summer of 1851 he landed in La Crosse still in poor health and with a cash capital of just one shilling, where, after working at carpentering or anything else that turned up for nearly two years, he engaged in the market gardening business. Finding the sandy soil at La Crosse not reliable for gardening or adapted to fruit culture, in 1856 he removed to La Crescent and started a general gardening, fruit growing and florist business. He planted his first orchard in 1857, and has continued to plant more or less trees every

year since, making his place virtually a Minnesota horticultural experiment station in which has been planted for trial every choice American variety of apples of which trees could be procured, together with pears, plums, cherries, grapes and other small fruits. He has been twice, in the winters of 1872-3 and 1884-5, nearly conquered and cleaned out by the elements, but has never surrendered to them.

He began to attend fairs and exhibit fruit of his own growing in 1864, and has followed it up down to the present time without a break of a single year. At the state fair held in Rochester in October, 1866, he made the largest exhibit of home grown fruit that had been made in the state, and assisted in the organization of this society, the first name on the role; he has continued a steadfast and active member. In September, 1868, he was elected vice-president of the society, and in October, 1889, president, and held the office until January, 1871. He was then made corresponding secretary, holding the office two years, and was then elected secretary for one year, and edited the second volume of transactions. Again from 1881 to 1884, he was president of the society, and has since been a member of the executive committee. In 1875, he was elected a member of the board of managers of the State Agricultural Society, and held the position twelve years. His has been an active life; beginning without any capital, except a knowledge of his business, and the help of a willing and frugal wife, he has created a comfortable home in one of the most beautiful spots in the Mississippi valley, and yet has found time to do much for the advancement of agriculture and horticulture, and has spoken and written much upon these subjects during the last thirty years, and for many years of the time the writing and study was done at night after long days of hard toil. His school education was limited to the most common English branches that were taught in the common schools of that day, but he has never ceased to continue to educate himself by reading and studying nature. Mr. Harris was married in December, 1850, to Miss Melissa J. Clayton, of Montgomery County, N.Y. She is still living. The fruit of this union is two sons and two daughters, all living and settled in Houston County.

NURYSERYMEN AND FLORISTS WHO ARE MEMBERS OF THE MINNESOTA STATE HORTICULTURAL SOCIETY.

NURSERYMEN.

J. O. Barrett.....Browns Valley
O. F. Brand.....Faribault
M. C. Bunnell.....Newport
P. M. Gideon.....Excelsior
J. S. Harris & Son (small fruits).....La Crescent
J. M. Underwood (Jewell Nursery Co.).....Lake City
A. W. Latham.....Excelsior
M. Pearce.....Chowen
Geo. P. Peffer.....Pewaukee, Wis
M. L. Tibbetts.....Dover
C. L. Smith.....Minneapolis
A. C. Tuttle.....Baraboo, Wis
A. A. Bost.....Excelsior
J. C. Kramer.....La Crescent
F. M. Kilbourne.....Lakeville, Dakota Co
M. W. Cook (small fruit).....Rochester
Wm. Tanner (Tanner & Seager).....Cannon Falls
Chas. Hawkinson.....Box 495, Minneapolis
E. J. Cutts.....Howard Lake
Clarence Wedge.....Albert Lea
G. W. Fuller.....Litchfield

FLORISTS.

F. G. Gould.....Excelsior
R. J. Mendenhall.....18th St. and 1st Av. S., Minneapolis
Gust. Malmquist.....Fair Oaks, Minneapolis
E. Nagel (E. Nagel & Co).....1118 West Lake St., Minneapolis
Wm. Wachlin.....Faribault
C. A. Smith (Smith Floral Co).....77 S. 7th St., Minneapolis
C. R. Howe.....Brooklyn Center
Jos. Taylor.....Fairview and Lincoln Ave., St. Paul
A. M. Caswell.....Litchfield
L. L. May (L. L. May & Co).....St. Paul
M. E. Powell.....St. Peter
Chas. Bennett.....35 W. 4th St., St. Paul
Henry Buckendorf.....Minneapolis
A. D. Roe.....Stillwater
O. A. Nordquist.....Oakland Cemetery, St. Paul
A. C. Bentley.....Stillwater

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